(105)

D-583-8-4-18
Revision 4.0

FINAL
SITE INSPECTION
OLIN CORPORATION SITE
HAMDEN, CONNECTICUT

TDD NO. F1-8305-04
NUS JOB NO. 3408
EPA SITE NO.
CONTRACT NO. 68-01-6699

FOR THE

REGION I
US EPA
SITE RESPONSE SECTION

JANUARY 15, 1985

NUS CORPORATION
SUPERFUND DIVISION

SUBMITTED BY

John M. Panaro
JOHN M. PANARO

REVIEWED AND APPROVED BY

Barbara K. Buckley for
RICHARD G. DINITTO
FIT I MANAGER

Richard G. DeLuca for
THOMAS PLANT
QUALITY ASSURANCE

NUS CORPORATION
CUSTODY ASSIGNMENT

The Quality Assurance Representative for Region I/FIT has authorized the assignment of the noted copy of this document to the custody of the person listed below:

Controlled Copy Number: 12

Name: Richard Cavagnero

Organization: Region I, EPA

Date of Assignment: January 15, 1985

The following is a list of persons who have been assigned a copy of this document and their respective controlled copy numbers:

Master, NUS, Region I	01
Project File, NUS, Region I	02
Don Smith, Region I, EPA	03
Richard Cavagnero, Region I, EPA	04-13
Tom Centi, NUS, Zone	14

NOTICE

The information in this document has been funded wholly by the United States Environmental Protection Agency (EPA) under Contract Number 68-01-6699 and is considered proprietary to the EPA.

This information is not to be released to third parties without the express written consent of the EPA and the NUS Corporation.

CONTENTS

ILLUSTRATIONS

ILLUSTRATIONS

EXECUTIVE SUMMARY

The Olin site is located in the town of Hamden, Connecticut, and is situated on a 102.8 acre piece of land. Leeder Hill Drive and Treadwell Street border the site on the east and north, respectively while the Penn Central railroad tracks border the site on the west. The site contains five interconnected ponds. Lake Whitney, a drinking water supply is situated across the street from the northern border of the site.

Olin (Winchester Repeating Arms Division) used the site as a gun powder and ammunition storage area from around the beginning of the twentieth century until 1973. The Hamden Health Department observed rubbish and chemical (spent solvents) disposal and the burning of combustible material at the site in March 1966. Although Olin removed most of the waste following an order by the town of Hamden in March 1966, the state became concerned about the site when Olin, in a 1979 report to the Congressional Subcommittee on Oversight and Investigation of Chemical Waste Disposal, acknowledged disposal, incineration and possible burial of industrial wastes that included various categories of chemicals such as organics, inorganics including heavy metals and trace metals, and highly volatile acids. Olin subsequently contracted Environmental Research and Technology, Inc. of Concord, Massachusetts, to conduct an investigation of the environmental effects of past disposal activities.

The site is characterized by prominent hills and ridges, swampy lowlands and valleys containing five interconnected ponds. The surficial geology of this area includes both stratified drift and till, with the till being restricted mainly to regions of higher elevations around the site. The ponds on the site are discharge points for local groundwater, which flows to them from the surrounding highlands. Lake Whitney is the largest and most significant surface water receptor downgradient of the site, while wells (industrial and residential) that surround the site are possible groundwater receptors.

On May 15 and 16, 1984, the NUS Corporation Field Investigation Team (NUS/FIT) sampled former disposal areas, on and off-site groundwater and on- and off-site surface water. Volatile organics, extractable organics and inorganics were detected in on- and off-site surface and groundwater and in the soil of the former disposal areas.

The NUS Region I FIT recommends the following actions:

- Installation of borings or monitoring wells upgradient of the H.A. Leed well to determine the source of the volatile organic contaminants.

- Quarterly sampling and priority pollutant analysis on groundwater from ERT well No. 7 and surface water from Pond D to indicate whether contaminants are migrating off-site.

- Further investigation of the area on the Anixter property where excavation took place in April to determine if contamination is present and if so, to find its extent.

- Possible soil removal from the areas where soil samples were obtained should be evaluated.

1.0 INTRODUCTION

1.1 Summary of NUS/FIT Involvement

The NUS Field Investigation Team (NUS/FIT) was tasked by the Region I U.S. Environmental Protection Agency (EPA), MA/CT/VT Site Response Section under Technical Directive Document (TDD) No. F1-8305-04 to conduct a site inspection at the Olin Site in Hamden, Connecticut (Appendix A). This was initiated after a preliminary assessment conducted by NUS/FIT recommended that a site inspection was necessary to define the severity of on-site contamination and the extent of its migration. Sampling for the site inspection was performed on May 15 and 16, 1984, and included groundwater, surface water and soil sampling.

1.2 Purpose/Objective

The purpose of the site inspection was to confirm the existence or absence of hazardous waste contamination at the site and to evaluate the likelihood of waste migration and the potential impact to the environment and surrounding population.

The objective of this evaluation is to ascertain the site's potential impact to human health and the environment by collecting samples, analyzing for organic and inorganic priority pollutants, evaluating the analytical data, and reviewing likely hydrogeologic pathways and receptors.

2.0 SITE DESCRIPTION

2.1 Site Location and Boundaries

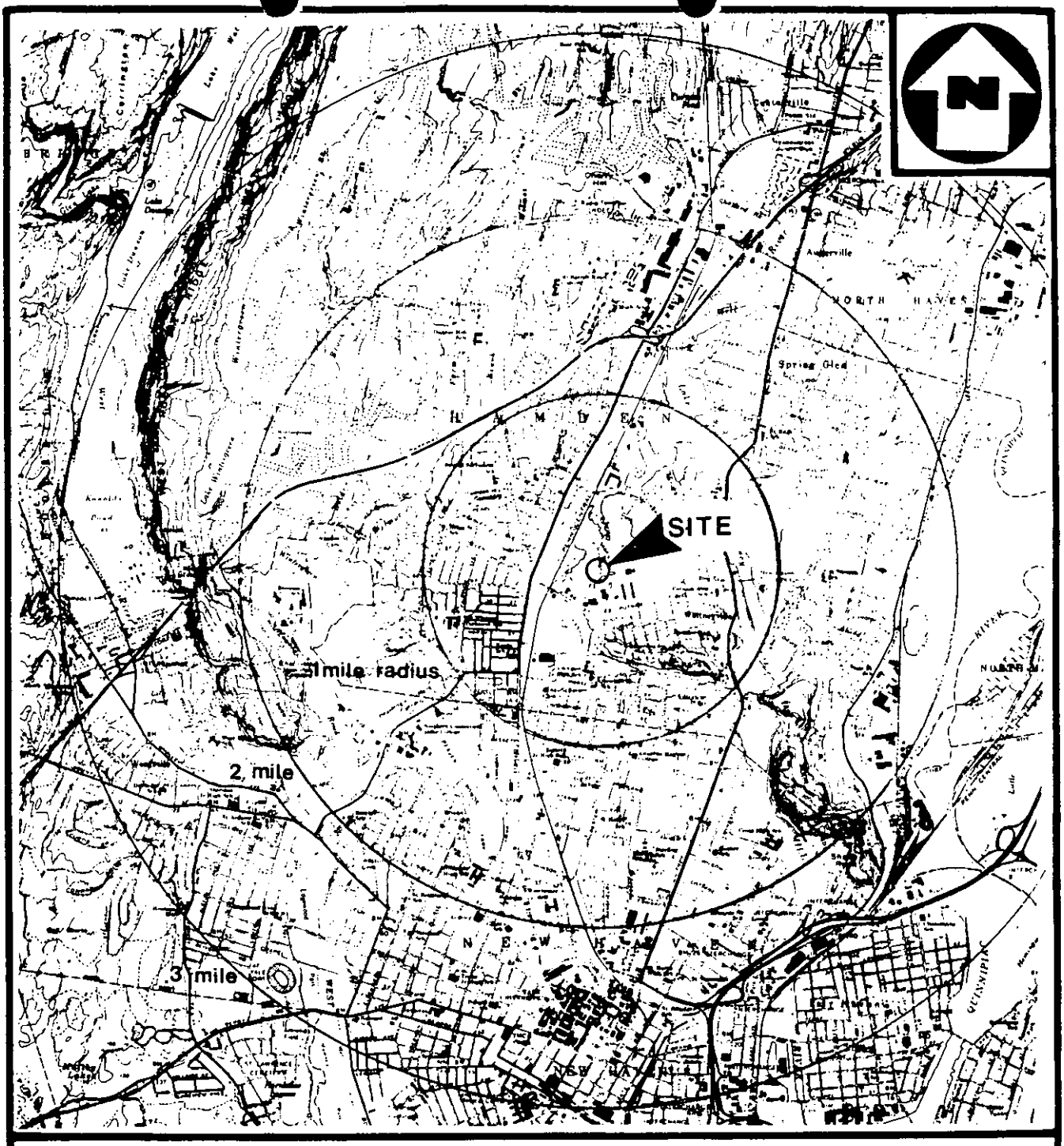
The Olin site is located on a 102.8 acre wooded parcel of land in the town of Hamden, Connecticut (41° 20' 52" north latitude and 72° 55' 30" west longitude)(Figure 1). Leeder Hill Drive and Treadwell Street border the site on the east and north, respectively. The Penn Central Railroad tracks border the site on the west and light industry along Putnam Avenue borders the site on the south (1). Buildings which border the site include the Southern New England Telephone Company and Whitney Retirement Home on the east and the H.A. Leed Company, Anixter Company, Capitol Tire, and Davenport Photo on the south (2).

The 102.8 acres of land that contains the site is wooded and contains no buildings. The former disposal and burning areas used by Olin are located on the southern portion of the site and are shown in Figure 2. Narrow paved and unpaved roads circle and traverse the site. The site is enclosed by a chain link fence and the only access is a gate off of Putnam Avenue (2).

2.2 Topography and Surface Drainage

The site is characterized by prominent hills and ridges, swampy lowlands and valleys containing five interconnected ponds. On-site surface water consists of the five ponds, a stream flowing into Pond A from a swamp south of the site, Pine Swamp south of Pond A and a stream flowing out of Pond E at the north end of the site (Figure 3). Off-site surface water consists of Lake Whitney north and east of the site, Quinnipiac River east of the site, Mill River southeast and north of the site, Beaver Pond south of the site and a swamp immediately south of the site (Figure 3). The average slope of the site is one percent (1).

A number of topographic features in the area are the result of man-made modifications of the landscape. Lake Whitney is one of several lakes and reservoirs created by dams. Small areas of artificial fill are present throughout the site; these include the causeways on the Pine Swamp tract, believed to have been built sometime prior to 1916 (3, 4, 5). Several gravel pits are present north of the site (3, 4).



BASE MAP IS A PORTION OF THE U.S.G.S. MOUNT CARMEL & NEW HAVEN, CONN. QUADRANGLE (7.5' SERIES, 1967, PHOTOREVISED 1972)

LOCUS PLAN

OLIN SITE

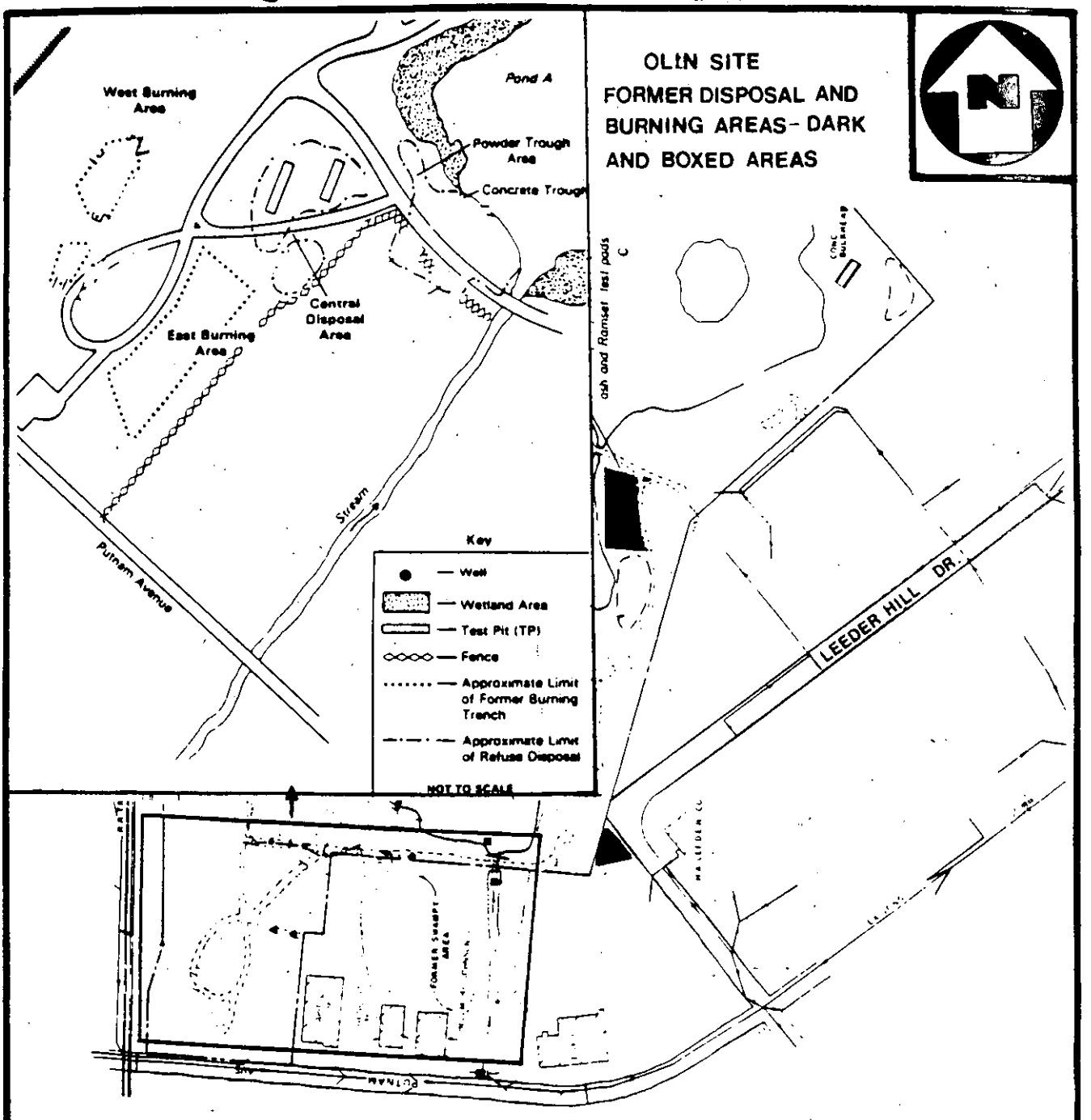
HAMDEN, CONNECTICUT

JUNE 1984

NUS CORPORATION

A Halliburton Company

FIGURE 1



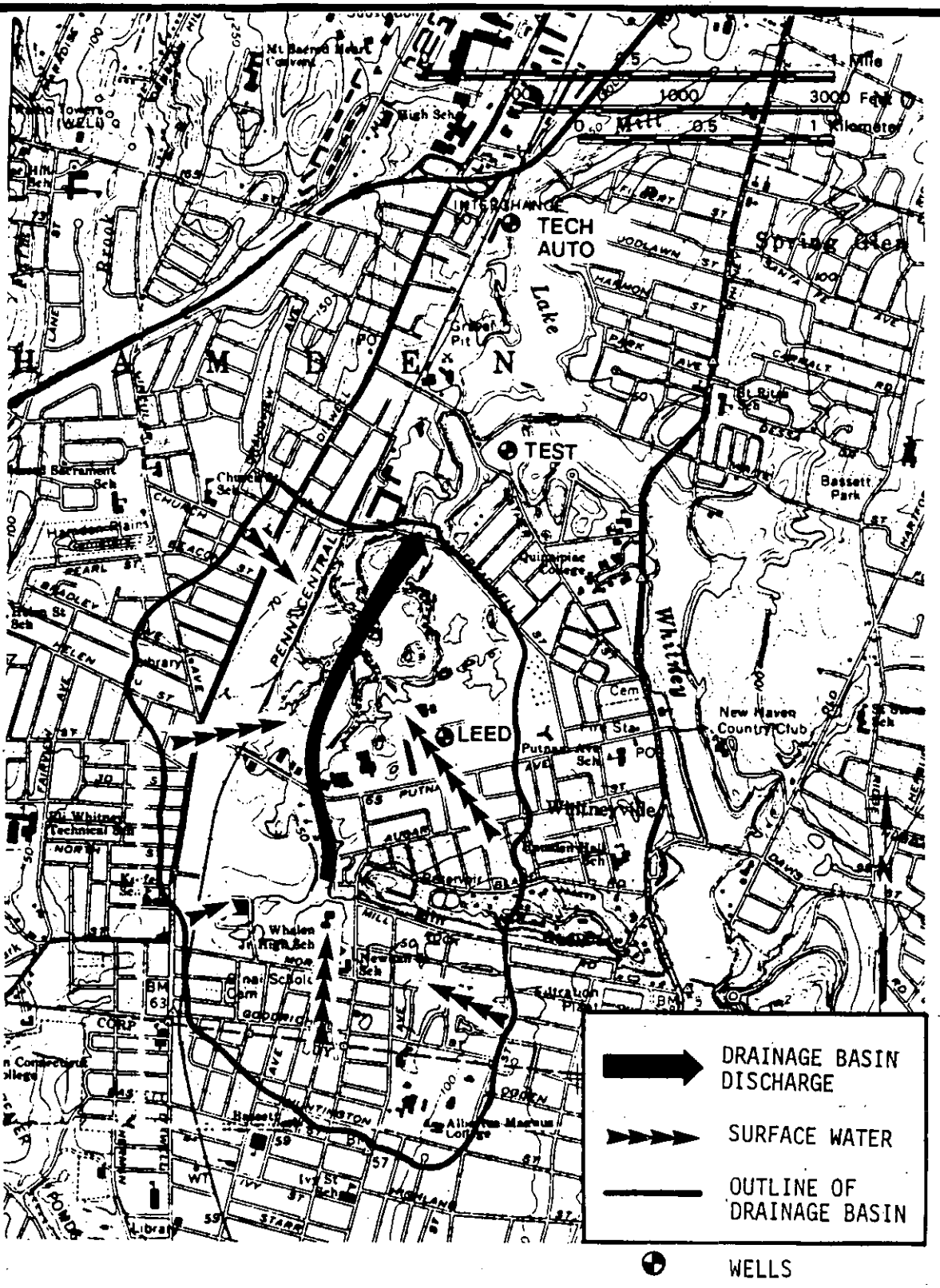
NOTE: BOXED MAP TAKEN FROM
ERT PHASE II INVESTIGATION
REPORT (JUNE 1982)

FORMER DISPOSAL AREAS
(BLACK AREAS AND BOXED MAP)
OLIN CORPORATION SITE
HAMDEN, CT

JULY 1984

NUS CORPORATION
A Halliburton Company

FIGURE 2



GENERALIZED SURFACE & GROUNDWATER FLOW DIRECTIONS

OLIN SITE
NEW HAVEN, CONNECTICUT

JULY 1984

NUS CORPORATION
A Halliburton Company

FIGURE 3

Surface drainage on the site is south-to-north as an unnamed stream flows into the site at Pond A and another stream flows out of the site from Pond E into Lake Whitney which is north of the site (6). However, regional drainage is generally north-to-south, paralleling the structural trends in the bedrock (3). The channels of the rivers and streams in the region are thought to have been slightly diverted as a result of regional glaciation (3). A number of ponds and swampy areas in the project region (including those on the Pine Swamp tract) occupy shallow basins (kettles) formed by the melting of residual blocks of glacial ice that had been buried in the glacial deposits (3). The kettles on the Pine Swamp property are part of the chain of kettles that extends southward into the New Haven area. Several of these kettles have been filled in since the time they were mapped (3).

2.3 Demography and Land Use

Densely populated communities are located near the site. Approximately 30,000 people reside within a one mile radius of the site which encompasses portions of the town of Hamden and the city of New Haven. There are approximately 94,000 people living within a two mile radius including the towns of Hamden, North Haven, and the city of New Haven. The towns of Hamden, North Haven, Woodbridge, and the city of New Haven are contained within a three mile radius where approximately 153,000 reside (7).

The site is currently inactive and consists of unoccupied land. Land use in the area varies widely. Industrial buildings border the site on south and west, a nursing home abuts the eastern border of the site, and Lake Whitney is located across the street on the northern border of the site. Agricultural land consisting of a vegetable farm owned by the Dadio family is situated across the street on the southern border of the site (7).

2.4 Climatology

The Hamden area receives an average yearly rainfall of 46 inches with a maximum expected rainfall of 3.0 inches in any one 24-hour period. The average yearly

surface and groundwater runoff is 24 inches, and the evapotranspiration rate is 28 inches per year (8, 9). The general wind direction is from the southwest and the average yearly temperature is approximately 59.9 degrees Fahrenheit (10).

2.5 Geohydrology

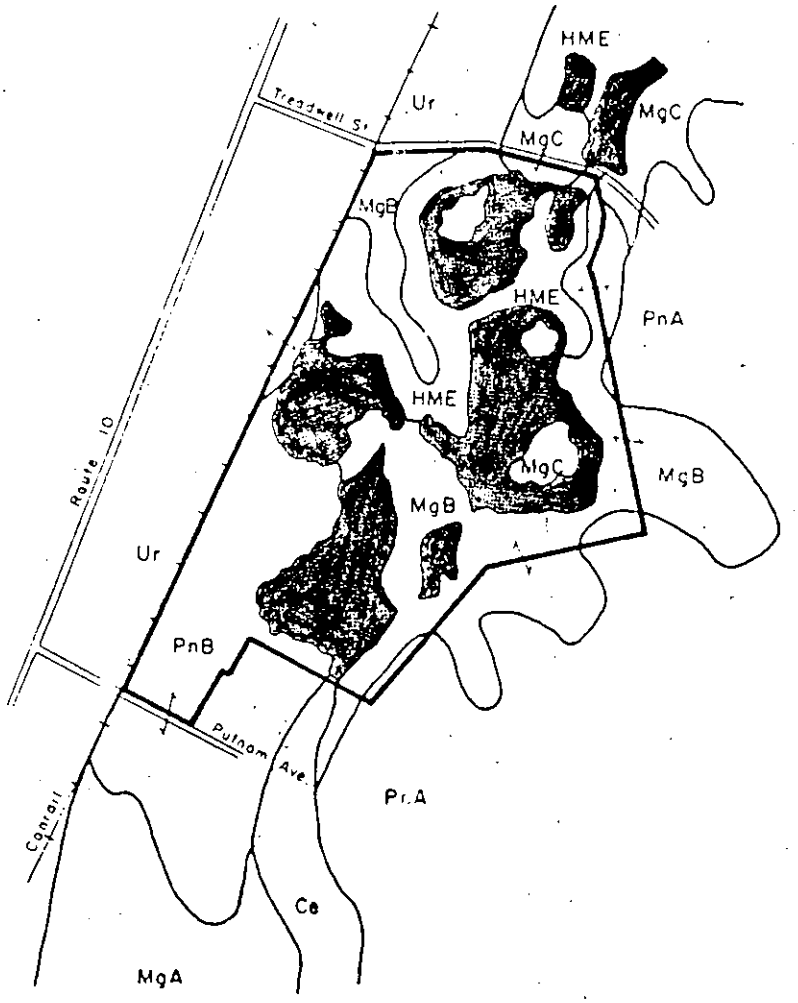
The surficial geology of this area includes both stratified drift and till, with the till being restricted mainly to regions of higher elevation around the site. The low-lying areas, including the Pine Swamp Property, are underlain by deposits of stratified sand, silt, and gravel, which may be as thick as 250 feet in the southern and eastern portions of the site. These stratified materials are primarily ice-contact deposits, and therefore exhibit typical glacial environment features such as kettle holes, kettle ponds, and kames (3, 11). In addition, small bodies of bouldery till may exist sporadically throughout the stratified drift.

Six borings drilled to depths of 35 to 50 feet on the Pine Swamp property in 1974 by Site Engineers, Inc. indicated that the stratified material in this area is generally composed of reddish-brown, fine to medium sand and gravel, with at least one body of reddish-brown sandy silt (12). The soils on this site are excessively drained and highly permeable, with pH's ranging from neutral to strongly acidic (Figure 4, Table 1).

The water table in the Pine Swamp area ranges in depth from 0 to 35 feet, and may vary considerably with the seasons (3, 12, 13). The kettle ponds in this location are apparently discharge points for local groundwater, which flows to them from the surrounding highlands (12, 14). The connection of these ponds with a local groundwater discharge area in the central part of the site is indicated by the fact that no surface water elevation gradient exists between them.

The deposits of stratified drift in this area constitute a significant regional aquifer, supplying water to local industries and residences (3, 15). Yields of wells screened in this aquifer vary widely according to saturated thickness, transmissivity, and storativity, with the highest yields being approximately 2000 gallons per minute (gpm), and the average yield being about 500 gpm (16). Many wells exist on and

SOILS MAP



NOTE: FROM ERT PHASE II INVESTIGATION REPORT JUNE 1982

SCALE: 1" = 1000'

0 1/4 1/2 mile

0 1000 2000 3000

WATER

ADAPTED FROM NEW HAVEN COUNTY SOIL SURVEY, U.S.D.A. - S.C.S.

OLIN CORPORATION SITE

HAMDEN, CT

JULY 1984

NUS CORPORATION

A Halliburton Company

FIGURE 4

TABLE 1

CHARACTERISTICS OF SOILS PRESENT ON THE
PINE SWAMP PROPERTY

MAP SYMBOL	SOIL NAME	PERMEABILITY	RATE OF RUNOFF	AVAIL. WATER CAPACITY	DEGREE OF DRAINAGE	SOIL pH
PnA	Penwood loamy sand, 0-3 % slopes	rapid	slow	low	excessive	slightly acid to very strongly acid
PnB	Penwood loamy sand, 3-8 % slopes	rapid	slow	low	excessive	slightly acid to very strongly acid
MgB	Manchester gravelly sandy loam, 3-8 % slopes	rapid to very rapid(1)	slow	low	excessive	---
MgC	Manchester gravelly sandy loam, 8-15 % slopes	rapid to very rapid(1)	slow	low	excessive	---
Ce	Carlisle Muck	moderately rapid	very slow	high	very poor	medium acid to neutral
HME	Hinckley and Manchester (terrace escarpments), 15-35 % slope	rapid to very rapid(1)	rapid	low	excessive	---
Ur	Urban land (2)	---	---	---	---	---

Note: From ERT Phase I Investigation Report of the Olin site (January 1981).

(1) rapid permeability in the surface layer and subsoil; very rapid permeability in the substratum.

(2) consists mainly of areas covered by buildings, paved roads and parking lots. Requires on-site investigation to determine engineering properties.

SOURCE: USDA SCS 1979.

around this site. The on-site wells were installed by a subcontractor to Environmental Research and Technology (ERT), a consulting firm hired by Olin to conduct a hydrogeologic investigation of the site. All wells installed during the ERT investigation were not advanced to underlying bedrock because of its excessive depth (32).

Groundwater wells that surround the site include the Dadio well south of the site, industrial wells at the H.A. Leed Company, southeast of the site and the Himmel Brothers Company west of the site, a New Haven Water Company test well northeast of the site, and a drinking water well located 1.3 miles north of the site at the Tech Auto Body Shop. All wells were completed in the stratified drift with the Leed well being the deepest at 192 feet. The New Haven Water Company test well and the Tech Auto Body Shop well are possible downgradient wells with the former being most likely to be affected because of its depth (100 ft) and proximity to the site. It is possible that the New Haven Water Company test well could draw contaminated groundwater when in use. This could also be true of the H.A. Leed well because of its depth (7).

2.6 Water Supply

Lake Whitney is the major water supply for the town of Hamden and for parts of New Haven. According to the New Haven Water Company, two private drinking water wells are known to exist in the vicinity of the site. The nearest well is located south of the site at the Dadio residence on the south side of Putnam Avenue and it serves the Dadio family. The other well is located approximately 1.3 miles north of the site at Tech Auto, Inc. which is along the west bank of Lake Whitney. This well serves approximately 25 people (7).

3.0 SITE HISTORY/ACTIVITY

3.1 Ownership History

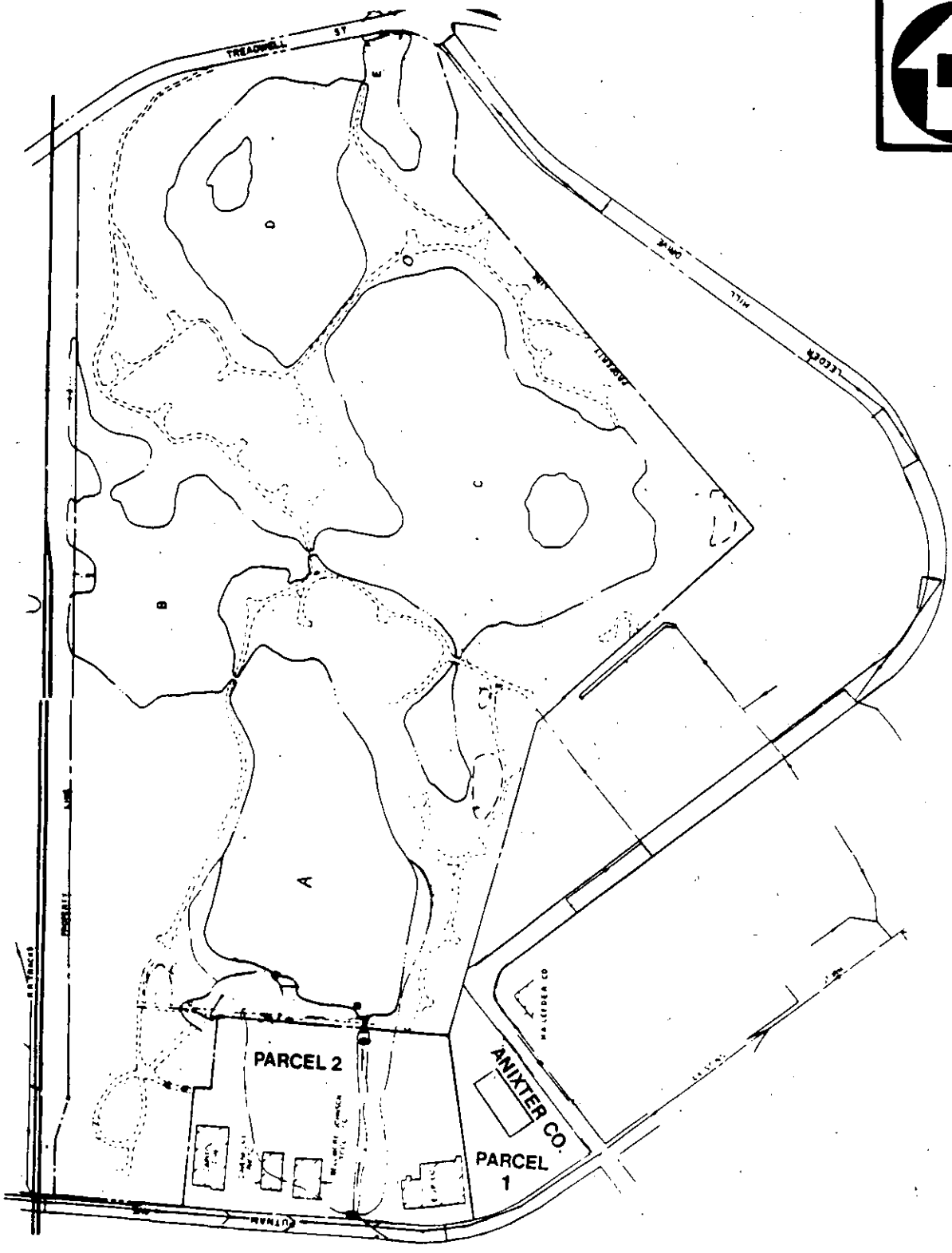
The Olin Corporation is the current owner of the site. Olin acquired the land sometime between 1889 and 1915 (17). In 1964, Olin sold a parcel of land that abutts the site (parcel 1 in Figure 5) to County Enterprises who in turn sold the land to the Anixter Company. Anixter currently maintains a building on that parcel of land. The U.I. Company has owned parcel 2 in Figure 5 since 1927 and Capitol Tire and Davenport Photo are the current tenants on this parcel (18).

3.2 Site History

Olin (Winchester Repeating Arms Division) used the site (property currently owned by Olin) as a gun powder and ammunition storage area from the time they acquired the property until 1973. Olin also test fired their ammunition at the site. Approximately thirty-five bunkers were located around the site to store gun powder an ammunition. The bunkers were removed in 1973 (17).

In February 1966, the Hamden Health Department received a complaint from a private citizen that dumping and burning of chemical waste (spent solvents) was occurring in the area of Putnam Avenue and Dixwell Avenue in Hamden. Claims were made that this burning generated odors and smoke that were offensive to the residents and businesses in the immediate vicinity. The Hamden Health Department investigated this complaint on March 15, 1966 and confirmed that burning was occurring on the Olin property. They observed truck loads of chemical material (bottles of spent solvents) and rubbish being transported from Olin's New Haven plant to the Olin site in Hamden for disposal (19).

A hearing was held on March 23, 1966 in the office of the Hamden Health Department to discuss the disposal and burning problem (20). Those in attendance included representatives from the Hamden Health Department, the Hamden Fire Department, and the New Haven Water Company. A representative of the Hamden



PROPERTY BOUNDARIES
OLIN CORPORATION SITE
HAMDEN, CT

JULY 1984

NUS CORPORATION
A Halliburton Company

FIGURE 5

Health Department stated that chemicals of all kinds were contained in bottles and found in shallow pits. A representative of Olin explained that these bottles were fired at from a distance to dissipate the chemical contents. At the conclusion of the meeting, the Hamden Health Department directed Olin to cease transporting materials to Hamden as of March 23, 1966, to cease burning of combustible material onsite by March 26, 1966, and to remove all non-combustible debris by April 6, 1966 (20).

The Hamden Health Department performed follow-up inspections on April 7, and June 3, 1966. They made the following observations during these inspections.

- All of the chemical waste had been removed.
- The pits that were used for refuse and burning were backfilled with clean fill.

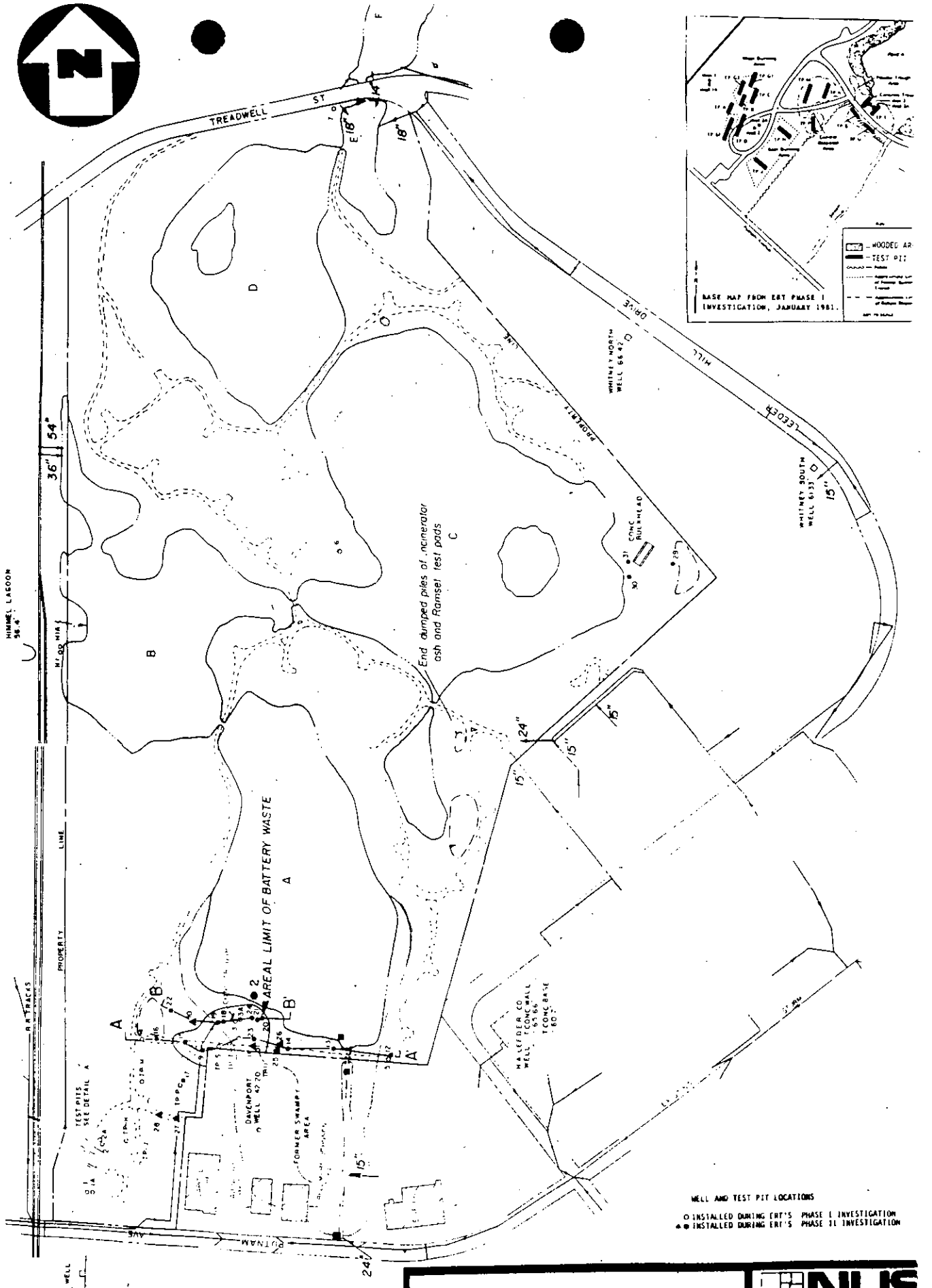
Olin stated that no more dumping and burning would occur (21).

In a 1979 report to the Congressional Subcommittee on Oversight and Investigation of Chemical Waste Disposal, Olin acknowledged disposal, incineration, and possible burial of industrial wastes that included various categories of chemicals such as organics, inorganics including heavy and trace metals, and highly volatile acids (22).

Early in 1980, Olin contracted Environmental Research and Technology, Inc. (ERT) to conduct an investigation of the environmental effects of past disposal activities. This investigation was conducted to support the transfer of property to the town of Hamden for use as recreational/open space. Their study included:

- Investigation of surface and groundwater hydrology of the area.

- Excavation of test pits in the disposal areas to ascertain what types of materials were buried (Figure 6).



WELL & TEST PIT LOCATIONS
OLIN CORPORATION SITE
HAMDEN, CT
JULY 1984

NUS CORPORATION
A Halliburton Company

FIGURE 6

- Installation of observation wells at 12 locations on the site (Figure 6) to establish groundwater conditions.

- Sampling and analysis of groundwater, surface water and sediment.

ERT presented a report to Olin in January 1981, and Olin volunteered the report to the Connecticut DEP (23). The results of the report are discussed in section 4.1.

After reveiwing the ERT Report and after receiving comments about it from the New Haven Water Company, the Connecticut DEP sent a letter to Olin on May 26, 1981, that requested a meeting to discuss several issues including:

- That the placement of well screens may have been inappropriate given the vertical component of groundwater flow at the site.

- That materials encountered in test pit excavation which exhibited a chemical or oily odor had not been identified.

- That effects of precipitation resulting in leaching of materials buried above the water table had not been evaluated.

- That recommendations should be made regarding possible off-site removal of residual materials.

- That the area covered by test pit excavation did not fully encompass all suspect source areas (24).

Two subsequent meetings were held at the Connecticut DEP to discuss the quesions raised by the ERT report. Representatives of the DEP, ERT, Olin, and the New Haven Water Company were present at the August 3, and October 23, 1981 meetings. After a discussion of the ERT report in the first meeting, the DEP informed Olin that it would issue a State Pollution Abatement Order requiring the removal of buried batteries and associated soil that constituted a significant

inorganic contamination to the ground and surface water (25). At the second meeting, Olin provided an alternative plan which included installation of additional wells at appropriate depths and locations to intercept contamination from battery disposal sites, drilling of more borings to try to define the extent of the battery disposal area, and the performance of EP-toxicity tests and analysis for manganese, zinc, chromium, mercury, cadmium and lead on a subset of samples (26).

On December 1, 1981, Olin sent a letter to the Connecticut DEP finalizing plans for further investigation to be conducted by ERT. In addition to the above mentioned intentions, Olin also agreed to conduct further sampling of some previously installed ERT wells (27).

ERT performed Phase II of their investigation from December 7-22, 1981. Representatives from Olin, ERT, the Connecticut DEP, and the New Haven Water Company were present during various periods of the investigation. The investigation consisted of installation of additional borings (a total of 23) and wells (a total of 17) which are shown in Figure 5 and sampling of groundwater, surface water, soil (from former disposal areas), and sediment (from the ponds)(28). ERT presented a report to Olin in June 1982 that showed contamination in the soil, groundwater, and surface water and also stated that groundwater was contaminated with volatile organic compounds before entering the site (i.e. from off-site sources).

The Connecticut DEP collected and analyzed samples from on and off-site locations in 1981 and 1982. On and off-site groundwater samples were collected from November 1981 to April 1982. In August 1982, two soil samples were collected from an area approximately 50 yards upgradient of ERT well no. 5 on property owned by the Anixter Company in response to the ERT Phase II investigation report that the groundwater was contaminated with volatile organics before entering the site (29, 30).

The Connecticut DEP confirmed the presence of volatile organic contamination and used this evidence to issue an abatement order to the Anixter company on January 1, 1984 to remove the contaminated soil. Fuss and O'Neil were contracted to perform the work described in the abatement order. A subcontractor to Fuss and O'Neil began removing soil on April 2, 1984. After this subcontractor encountered volatile organic contaminants and other debris down to depths of approximately 25 feet, the Connecticut DEP decided to install two monitoring wells to intercept the contaminated groundwater before it moved onto the site and to fill the area where soil was excavated with clean fill (31).

4.0 WASTE TYPES AND QUANTITIES

4.1 Wastes Present and Quantities

The disposal history of the Olin site is presented in section 3.2 of this report. Although Olin removed the majority of the waste and refuse within two weeks after their meeting with the town of Hamden, other waste remains on the site. ERT's Phase I investigation of the site identified four disposal and/or burning areas (Figure 2). Excavation of test pits indicated that two small areas had been used predominantly for burning scrap wood (referred to as the east and west burning areas). These areas also contained minor amounts of battery waste, scrap metal and glass bottles. The central disposal area appeared to have been used solely for burial of building demolition rubble. A fourth area, at the southern end of Pond A, contained battery waste, demolition rubble, domestic waste, and miscellaneous debris from the New Haven Winchester plant (32). ERT's Phase II investigation revealed another disposal area to the southwest of Pond C that contained primarily incinerator ash, demolition debris, domestic type refuse and ramset (concrete) test pads. It is not known how much waste material was originally contained or now remains on the site, but Olin estimates that at least 3500 cubic yards of waste containing the remains of flashlight batteries underlie the site in the disposal area near Pond A (30). These remains were the only evidence of on-site waste observed by the NUS/FIT during the site visit and site inspection.

Analytical data for soil, sediment, groundwater, and surface water samples were obtained by ERT during their two site investigations, while the state of Connecticut obtained analytical data for groundwater from November 1981 to April 1982 and soil in August 1982. ERT's Phase I Investigation analytical results are listed in Appendix B, Phase II analytical results are listed in Appendix C and the state of Connecticut's analytical results are listed in Appendix D (29, 30, 33).

All data was evaluated with regard to the detection limit of each compound and therefore all comments that appear when reporting the data are made in reference to this fact i.e. slightly or significantly above detection limits.

ERT's Phase I Investigation of the Olin site detected organic contamination in on- and off-site groundwater and on-site sediments, and inorganic contamination in on-site groundwater and sediments. Bis(2-ethylhexyl)phthalate was detected in the off-site Himmel well (25 ppb), and two on-site wells (3 and 20 ppb), while di-n-butyl phthalate was detected in one on-site well (25 ppb). Methylene chloride was detected in three on-site wells (8-14 ppb), while the off-site H.A. Leed well and the on-site ERT well immediately downgradient (ERT-5) contained a variety of volatile organic compounds with ERT-5 containing levels of TCE (500 ppb), 1,2-trans-dichloroethylene (710 ppb) and tetrachloroethylene (2400 ppb) significantly above detection limits. A number of extractable organic compounds, and one volatile organic compound (methylene chloride) were detected in the sediment of Pond A, Pond B, and Pond E. Manganese and zinc were found in levels slightly above detection limits in the groundwater near the southern end of Pond A. Lead was detected (70-750 ppb) in the sediments of all the ponds.

ERT's Phase II Investigation detected organic contamination in on- and off-site wells and inorganic contamination in on-site wells. Fluoranthene was the only extractable organic compound detected and that was in one on-site ERT well (22 ppb). Volatile organic analysis detected 1,1-dichloroethylene in two on-site wells (20 ppb), trans-1,2-dichloroethylene in two on-site wells (10-70 ppb), tetrachloroethylene in one on-site well (14 ppb), trichloroethylene in one on-site well (58 ppb) and toluene in one on-site well (39 ppb).

Non-priority pollutant volatile organic compounds detected included acetone in three on-site wells (200-570 ppb), tetrahydrofuran in eight on-site wells (30-1,300 ppb) and the off-site Davenport Photo well (45 ppb), ethyl ether in one on-site well (300 ppb), and tertiary-butyl alcohol in four on-site wells (350-5300 ppb) the Davenport Photo well (890 ppb). Inorganic contamination detected included manganese in seven on-site wells (2,900-21,000 ppb) and zinc in three on-site wells (1,200-6,900 ppb). The EP-toxicity test was performed for on-site monitoring well core (split spoon) samples, and lead was found above detection limit levels in one sample and zinc found above detection limit levels in five samples.

The state of Connecticut detected volatile organic contaminants in nine on-site ERT wells and the off-site Davenport Photo well with the most contaminants and highest concentrations occurring in ERT-5, ERT-12, and ERT-29. Analysis of the soil on the Anixter property that borders the Olin site and Leeder Hill Drive also detected a number of volatile organic contaminants. Inorganic analysis of on-site groundwater detected lead in three on-site wells (280-940 ppb), zinc in two on-site wells (460-490 ppb), and manganese in two on-site wells (8,000-12,000 ppb).

4.2 Waste Disposition

In order to prepare for the site inspection, the NUS/FIT performed a site visit on April 6, 1984 to observe locations of former waste disposal areas (that possibly contained buried waste) and groundwater monitoring wells. The visit consisted of viewing the site with Paul Duff, the manager of Olin's Energy and Environmental Affairs. The following observations were made:

- A fenced access road off of Putnam Avenue provided the only access to the site.
- Five ponds existed on the site.
- Wildlife (swans) and recreational activities (fishing) were observed.
- The only visible disposal area was located on the south shore of Pond A. Battery remains were scattered on the ground.
- While walking past ERT well No. 5, an excavation was observed approximately 50 yards upgradient on property owned by the Anixter company. The excavated pit was approximately 25 feet deep and while NUS/FIT observed the excavation, one of the excavators stated that there was a chemical odor in the pit.

During the site visit, Paul Duff volunteered the following information about the site. Bunkers, located all around the site, were used to house gun powder and

ammunitions. Test firing of the ammunition was performed on the site. In addition, Paul Duff stated that the only waste that he considered to be a possible hazard was the battery waste. The only visible signs of the waste was remains of old batteries scattered on the ground near ERT wells 3 and 3A (32).

4.3 Receptors

Most of the burning and disposal areas are located south and upgradient of Pond A which is the point of discharge for groundwater flowing through the previous disposal areas. There is a perched groundwater mound underlying the battery waste disposal area (30). It is perched on top of fine-grained sediments composed of fine sand, silt, and clay that underlie the waste. These sediments restrict vertical flow of shallow groundwater. The relatively rapid permeability of the stratified drift and the overlying soils may allow precipitation to leach contaminants from the battery waste into the perched groundwater which eventually discharges into Pond A (30).

Pond A is hydrologically linked to all the other ponds and surface water flows into Lake Whitney from the northern end of the site. Likewise, general groundwater flow patterns parallel the surface water (30). Lake Whitney serves as a major drinking water supply for the town of Hamden and part of New Haven. A drinking water well is located approximately 1.3 miles north (upgradient) of the site at Tech Auto, located along the west bank of Lake Whitney and it serves approximately 25 people (7)(30).

5.0 SITE INSPECTION

5.1 Logistics and Site Set-Up

On the day prior to this site inspection (5/14/84), a meeting was held for all personnel involved in the site inspection (John Panaro, Robert Palermo, Robert Ross, and Lawrence Fitzgerald). At this time, the site layout and command post location were discussed, as well as Quality Assurance/Quality Control needs, decontamination procedures, and possible hazards associated with the site.

Access to the site was obtained through Olin's Manager of Energy and Environmental Affairs, Paul Duff, prior to the inspection.

The command post was located approximately 50 yards from the gate at the entrance of the site off of Putnam Avenue, and the van was placed approximately 10 yards from the hotline. This area served as a departure point for the sampling team and as a location for sample equipment and personnel decontamination. Although previous air monitoring during the site visit did not detect ambient levels of organic vapors above background, monitoring was still conducted during the site inspection with an HNu photoionizer while collecting groundwater and soil samples. During the site inspection, no ambient levels above background were detected in the breathing zone (only in two on-site monitoring well casings).

5.2 Technical Approach

On May 15 and 16, 1983, the NUS/FIT performed a site inspection at the Olin Corporation site. The main objective of the site inspection was to obtain soil samples from areas of previous waste disposal; surface water samples from on-site ponds, exiting and entering streams, and Lake Whitney; and to obtain groundwater samples from on- and off-site wells for organic (Appendix E) and inorganic (Appendix F) priority pollutant analyses. A total of 28 samples were collected. Sample locations are listed in Table 2.

TABLE 2
SAMPLING POINTS
May 15 and 16, 1984

GROUNDWATER

Well	Date Sampled	Depth
Dadio	5/15	30'
ERT 1	5/15	64'8"
ERT 1A	5/15	42'
ERT 2	5/15	61'
ERT 2A	5/15	40'9"
Himmel	5/16	55'
Tech Auto	5/16	unknown
HI	5/15	20'
ERT 3	5/15	66'6"
ERT 3 Dup.	5/15	66'6"
ERT 3A	5/15	41'6"
ERT 13	5/16	6'
ERT 5	5/16	66'
ERT 12	5/16	13'5"
ERT 7	5/16	58'
H.A. Leeds	5/16	192' (in strat. drift)
Whitney Retirement Home (Northwell)	5/16	unknown

SURFACE WATER

Source	Date Sampled
Pond A	5/16
Pond B	5/16
Pond C	5/16
Pond D	5/16
Pond E	5/16
Lake Whitney (near Treadwell St.)	5/16
Stream before Pond A	5/16
Stream before bridge on Putnam Ave	5/16

SOIL

Source	Date Sampled
near ERT-3	5/16
near ERT-3 Dup.	5/16
near Pond C (south)	5/16

Soil samples were collected by digging beneath the soil surface (6-inches at S-1 and 12-inches at S-3) with a stainless steel trowel and placing the soil into a 16 ounce jar, 8 ounce jar and two 40 ml septum sealed vials. Surface water samples were collected by submerging the sample containers into the water near the edge of the body of water. The groundwater samples were collected from wells with a bailer after the well had been purged of three times the standing volume of water by a centrifugal or air driven pump. Each surface water and groundwater sample consisted of two 40 ml septum sealed vials, two half gallon glass bottles and one 1 liter polyethylene bottle. The site inspection was conducted in accordance with NUS/FIT Standard Operating Guideline No. 8 (groundwater sampling), No. 9 (surface water sampling), No. 10 (soil sampling), and No. 23 (decontamination procedures). An extra set of samples was collected at each sampling location (duplicates at soil locations and replicates at water locations) so that Olin was provided with split samples.

Ambient air characterization was conducted with an HNu Photoionizer while taking soil samples and before purging wells. Readings above background were detected at sample locations G-14 (2 ppm) and G-15 (0.5 ppm). These levels were detected in the well casing and not in the breathing zone.

Decontamination of sample containers and personal equipment involved an alconox and water wash followed by a water rinse. All on-site samples required decontamination. Water samples collected in 44 ml vials for volatile analysis were preserved with mercuric chloride to a final concentration of 15 ppm ($HgCl_2$). Water samples collected in one liter polyethylene bottles for metal analysis were preserved with HNO_3 to a final pH less than 2.0. All samples collected for organic analysis were packed in ice after collection.

The personnel and respiratory protection levels for sample collection were "C" for the soil and "D" for the surface and groundwater samples. Level "C" protection consisted of a tyvek coverall, rubber boots, surgical gloves and an ultra-twin respirator, while level "D" protection consisted of a tyvek coverall and rubber boots. An approved site safety plan was generated for the site inspection. Work conducted during the site inspection adhered to this safety plan.

5.3 Results

All of the samples were analyzed for the volatile organic priority pollutants (Appendix B), extractable organic priority pollutants (Appendix B), and the Task 1 and 2 inorganic priority pollutants (Appendix C). Based on previous groundwater, surface water, and soil analysis performed by ERT and the state, lead, magnesium, and zinc were the suspected metal contaminants in the former disposal areas while a variety of volatile organic compounds were the suspected organic contaminants. The samples were sent to two national contract laboratories as follows:

Water and Soils/Metal Analysis (Task 1 and 2 inorganics):
Rocky Mountain Analytical, Arvada, Colorado

Water and Soils/Organic Analysis:
Mead Compuchem, Chapel Hill, North Carolina

The analytical results are listed in Tables 1-9 and also are presented graphically in Figures 8-13. The following table lists the Figures and Tables of specific analytical results.

Volatile organic analyses of groundwater - Table 1, Figure 7
Volatile organic analyses of surface water - Table 4, Figure 9
Volatile organic analyses of soil - Table 7, Figure 11
Extractable organic analyses of groundwater - Table 2, Figure 7
Extractable organic analyses of surface water - Table 5, Figure 9
Extractable organic analyses of soil - Table 8, Figure 11
Inorganic (metal) analyses of groundwater - Table 3, Figure 8
Inorganic (metal) analyses of surface water - Table 6, Figure 10
Inorganic (metal) analyses of soil - Table 9, Figure 12

Previous analyses of samples from the site had shown lead, magnesium and zinc contamination at one of the former disposal areas near ERT monitoring wells numbered ERT-3 and ERT-3A and a variety of volatile organic contaminants in the groundwater from monitoring wells ERT-5 and ERT-12. Results from the analyses

TABLE 3

Volatile Organic Priority Pollutant Analyses of On and Off-Site Groundwater Samples Collected During the NUS Site Inspection of the Olin Site Inspection on May 15 and 16, 1984.

	ERT Well No. (concentration in ppb)											
Contaminant	Field Blank	1	1A	2	2A	3	3A	5	12	H1	13	H.A. Leed Well
1,2-dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.1
methylene chloride	ND	ND	ND	6.2	ND	ND	6.9	17	17	6.9	7.1	6.9
tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	140	300	ND	ND	190
trichlororethylene	ND	ND	ND	ND	ND	ND	ND	8	33	ND	ND	55
chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	56
1,1,1-trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	230
1,1-dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11
trans-1,2-dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	23
1,2-dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	30
fluorotrichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	17

TABLE 3 (cont'd)

Volatile Organic Priority Pollutant Analyses of On and Off-Site Groundwater Samples Collected During the NUS Site Inspection of the Olin Site Inspection on May 15 and 16, 1984.

	ERT Well No. (concentration in ppb)					
Contaminant	Dadio Well	3 dup	7	Whitney Ctr. South Well	Himmel Well	Tech Auto Well
1,2-dichloroethane	ND	ND	ND	ND	ND	ND
methylene chloride	ND	ND	8.7	7.6*	720**	ND
tetrachloroethene	ND	ND	ND	ND	ND	ND
trichlororethylene	ND	ND	ND	ND	ND	ND
chlorobenzene	ND	ND	ND	ND	ND	ND
1,1,1-trichloroethene	ND	ND	ND	ND	ND	ND
1,1-dichloroethene	ND	ND	ND	ND	ND	ND
trans-1,2-dichloroethene	ND	ND	ND	ND	ND	ND
1,2-dichloropropane	ND	ND	ND	ND	ND	ND
fluorotrichloromethane	ND	ND	ND	ND	ND	ND

* - levels are approximate due to surrogate recoveries slightly out of QC limits.

** - surrogate recoveries were excessively low and the holding time was excessive. Therefore, this value should be considered approximate.

TABLE 4

Extractable Organic Priority Pollutant Analyses of On and Off-Site Groundwater Samples Collected During the NUS Site Inspection of the Olin Site Inspection on May 15 and 16, 1984.

	ERT Well No. (concentration in ppb)																	
Contaminant	Field Blank	1	1A	2	2A	3	3A	5	12	H1	13	H.A. Leed Well	Dadio Well	3 dup	7	Whitney Ctr. South Well	Himmel	Tech Auto
di-n-butyl phthalate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	110	ND	ND	ND
di-n-octyl phthalate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	640	ND	21*	ND

* - levels are approximate due to surrogate recoveries slightly outside of QC limits.

TABLE 5
PRIORITY POLLUTANT INORGANIC ANALYSES OF ON AND OFF-SITE GROUNDWATER
OBTAINED DURING THE OLIN SITE INSPECTION PERFORMED BY NUS/FIT ON MAY 15 AND 16, 1984

PRIORITY POLLUTANT INORGANIC ELEMENTS Concentration in ppb	Field Blank	ERT-1A	ERT-2	ERT-2A	ERT-3	ERT-3A	ERT-5	ERT12
(TASK 1)								
Aluminum	<200	628	<200	<200	<200	<200	<200	5,700
Chromium	<10	<10	<10	<10	<10	<10	<10	14
Barium	<100	<100	<100	<100	121	<100	276	<100
Beryllium	<5	<5	<5	<5	<5	<5	<5	<5
Cobalt	<50	<50	<50	<50	<50	<50	<50	<50
Copper	<50	<50	51	51	<50	<50	<50	<50
Iron	<50	81,800*	50,700*	40,200*	43,100*	40,200*	3,530	27,200*
Nickel	<40	<40	<40	<40	<40	<40	<40	<40
Manganese	<10	398	285	11,700	725	563	2,140	7,570
Zinc	<10	1620	704	1,080	136	126	185	89
Boron	-	-	-	-	-	-	-	-
Vanadium	<200	628	<200	<200	<200	<200	<200	<200
Silver	<10	<10	<10	<10	<10	<10	<10	<10
(TASK 2)								
Arsenic	<10	<10	<10	<10	<10	<10	<10	<10
Antimony	<20	<20	<20	<20	<20	<20	<20	<20
Selenium	<2	<2	<2	<2	<2	<2	<2	<2
Thallium	<10	<10	<10	<10	<10	<10	<10	<10
Mercury	<0.2	<0.2	.27	<0.2	.67	0.23	<0.2	<0.2
Tin	<20	<20	<20	<20	<20	<20	<20	<20
Cadmium	<1	<1	2.6	1.0	<1	<1	<1	1.6
Lead	<5	<5	14	39	21	27	<5	24

* - Duplicate analysis was outside QC limits, therefore iron values should be considered approximate.

TABLE 5 (continued)

PRIORITY POLLUTANT INORGANIC ELEMENTS	H-1	ERT-13	Leed Well	Dadio Well	ERT-3 dupl.	ERT-7	Whitney S. Well	Himmel Well	Tech Well
(TASK 1)									
Aluminum	4,090	53,600	<200	<200	120	<200	<200	<200	<200
Chromium	<10	115	<10	<10	<10	<10	<10	<10	<10
Barium	112	1,160	119	<100	<100	<100	<100	<100	<100
Beryllium	<5	<5	<5	<5	<5	<5	<5	<5	<5
Cobalt	<50	<50	<50	<50	<50	<50	<50	<50	<50
Copper	<50	185	<50	<50	<50	<50	<50	<50	77
Iron	7,050	48,100*	<50	<50	24,500*	56,200*	<50	<50	<50
Nickel	<40	52	<40	<40	<40	<40	<40	<40	<40
Manganese	227	374	133	<10	644	242	<10	14	14
Zinc	40	1490	<10	81	144	366	<10	<10	<10
Boron	-	-	-	-	-	-	-	-	-
Vanadium	<200	<200	<200	<200	<200	<200	<200	<200	<200
Silver	<10	<10	<10	<10	<10	<10	<10	<10	<10
(TASK 2)									
Arsenic	<10	80	<10	<10	<10	<10	<10	<10	<10
Antimony	<20	<20	<20	<20	<20	<20	<20	<20	<20
Selenium	3.9	3.7	<2	<2	<2	<2	<2	2.0	2.0
Thallium	<10	<10	<10	<10	<10	<10	<10	<10	<10
Mercury	<0.2	2.8	<0.2	<0.2	0.67	.22	<0.2	<0.2	<0.2
Tin	<20	<20	<20	<20	<20	<20	<20	<20	<20
Cadmium	<1	15	<1	<1	<1	<1	<1	<1	<1
Lead	11	1,860	<5	<5	<5	12	<5	<5	<5

TABLE 6

Volatile Organic Priority Pollutant Analyses of On and Off-Site Surface Water Samples Collected During the NUS Site Inspection of the Olin Site Inspection on May 15 and 16, 1984.

Contaminant	Stream before Pond A	Stream before bridge on Putnam Ave.	Pond A	Pond B*	Pond C	Pond D*	Lake Whitney (near Treadwell Street)	Himmel Pit
chloroform	21	ND	ND	-	ND	-	-	ND
methylene chloride	ND	ND	ND	-	ND	-	-	6.2**

concentration in ppb

* - data was rejected because the holding time was exceeded

** - data is approximate due to surrogate recoveries slightly out of QC limits.

TABLE 7

Extractable Organic Priority Pollutant Analyses of On and Off-Site Surface Water Samples Collected During the NUS Site Inspection of the Olin Site Inspection on May 15 and 16, 1984.

Contaminant	Stream before Pond A	Stream before bridge on Putnam Ave.	Pond A	Pond B*	Pond C	Pond D*	Lake Whitney (near Treadwell Street)	Himmel Pit
di-n-octyl phthalate	ND	ND	ND	ND	ND	ND	ND	28

(concentration in ppb)

TABLE 8

PRIORITY POLLUTANT INORGANIC ANALYSES OF ON AND OFF-SITE SURFACE WATER COLLECTED DURING THE NUS SITE INSPECTION OF THE OLIN SITE
(May 15 and 16, 1984)

PRIORITY POLLUTANT
INORGANIC ELEMENTS

Concentration in ppb	Stream before Pond A	Stream before Putnam	Pond A	Pond B	Pond C	Pond D	Lake Whitney Treadwell	Himmel Pit
(TASK 1)								
Aluminum	<200	<200	1390	581				
Chromium	<10	<10	16	<10	<10	<10	<10	<10
Barium	<100	<100	248	<100	<100	<100	<100	<100
Beryllium	<5	<5	<5	<5	<5	<5	<5	<5
Cobalt	<50	<50	<50	<50	<50	<50	<50	<50
Copper	<50	<50	<50	<50	<50	<50	<50	68
Iron	213*	649*	14,000*	1,770*	980*	308	291	346
Nickel	<40	<40	<40	<40	<40	<40	<40	<40
Manganese	18	66	2,300	422	171	95	101	38
Zinc	17	22	1,280	57	28	<10	<10	39
Boron	-	-	-	-	-	-	-	-
Vanadium	<200	<200	<200	<200	<200	<200	<200	<200
Silver	<10	<10	<10	<10	<10	<10	<10	<10
(TASK 2)								
Arsenic	<10	<10	<10	<10	<10	<10	<10	<10
Antimony	<20	<20	<20	<20	<20	<20	<20	<20
Selenium	<2	<2	<2	<2	<2	<2	<2	<2
Thallium	<10	<10	<10	<10	<10	<10	<10	<10
Mercury	1.4	<0.2	<0.2	<0.2	<0.2	<0,2	<0.2	<0.2
Tin	<20	<20	<20	<20	<20	<20	<20	<20
Cadmium	<1	<1	3.6	<1	<1	<1	<1	<1
Lead	<5	8.3	182	58	22	6.4	6.1	10

* - Duplicate analysis was outside QC limits, therefore iron values should be considered approximate.

TABLE 9

Volatile Organic Priority Pollutant Analyses of
Soil Samples Obtained from Former Disposal Areas on
the Olin Site during the Site Inspection on May 15 and 16, 1984.

Contaminant	S-1 near Well 3	S-3 near Pond C	S-1 Duplicate	Soil Blank
trichloroethylene	ND	9.0*	ND	ND

* - levels are approximate due to surrogate recoveries slightly outside of QC limits.

TABLE 10

Extractable Organic Priority Pollutant Analyses of Soil Samples Obtained from Former Disposal Areas on the Olin Site during the Site Inspection on May 15 and 16, 1984.

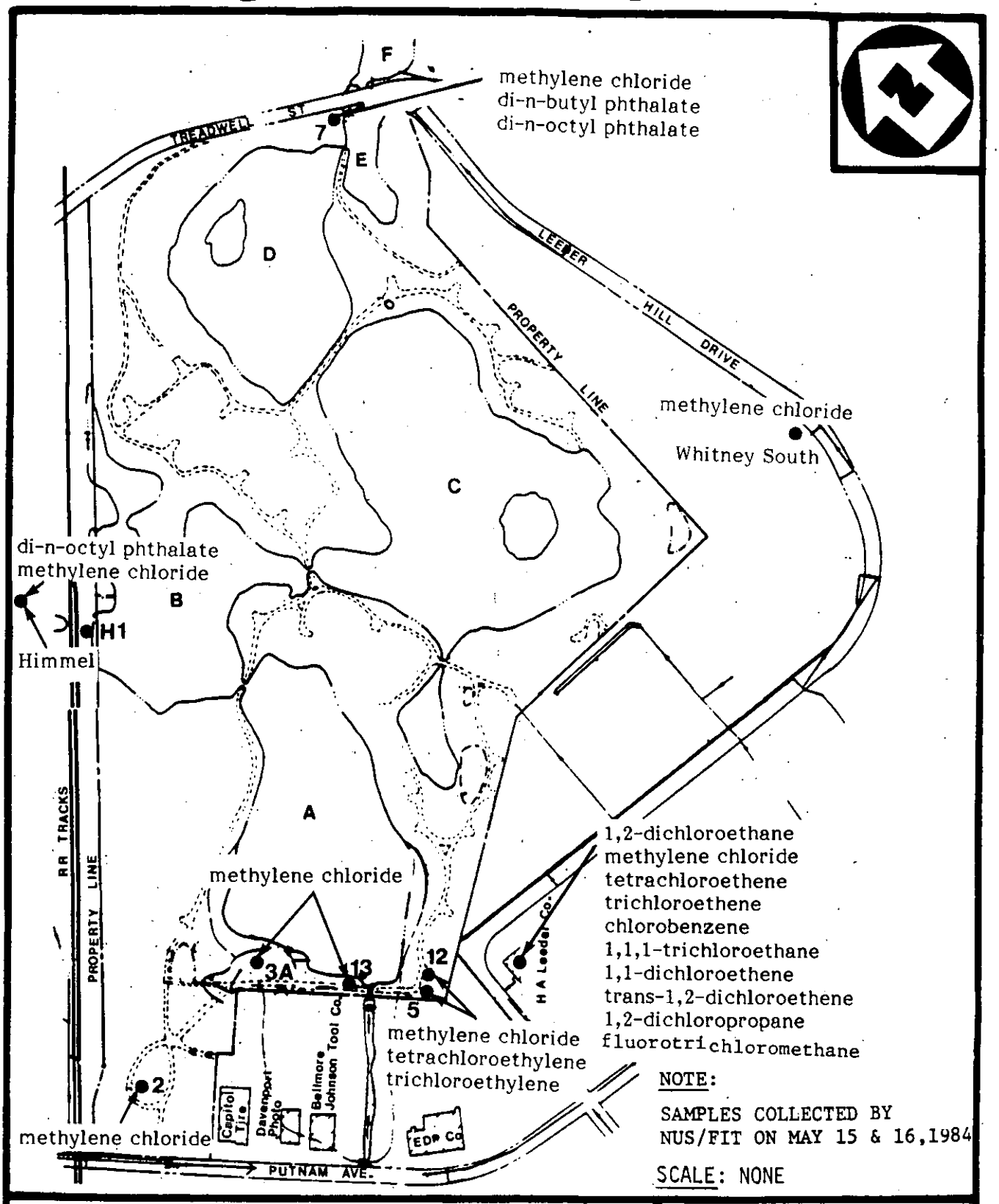
Contaminant	S-1 near Well 3	S-3 near Pond C	S-1 Duplicate	Soil Blank
di-n-butyl phthalate	2,000*	ND	1,800*	ND
fluoranthene	ND	1,400	ND	ND
bis(2-ethylhexyl) phthalate	ND	910	ND	ND
benzo(a)anthracene	ND	710	450*	ND
chrysene	ND	820	460*	ND
phenanthrene	ND	1,200	ND	ND
pyrene	ND	1,400	840*	ND
N-nitrosodiphenylamine	ND	ND	520*	ND
flourene	ND	ND	620*	ND

* - Blind duplicate analyses was outside QC limits because of poor agreement between duplicate samples. As a result, the concentrations of these compounds should be considered approximate.

TABLE 11
PRIORITY POLLUTANT INORGANIC ANALYSES OF SOIL SAMPLES OBTAINED FROM FORMER DISPOSAL AREAS ON THE OLIN SITE DURING THE NUS SITE INSPECTION
(May 15 and 16, 1984)

PRIORITY POLLUTANT INORGANIC ELEMENTS Concentration in ppm	S-1 near ERT-3	S-3 near Pond C	S-1 duplicate	Soil blank
(TASK 1)				
Aluminum	5,260	5,560	5,180	7,060
Chromium	10	21	12	12
Barium	64	254	63	50
Beryllium	0.31	<0.2	0.32	0.34
Cobalt	6.2	5.8	6.2	7.0
Copper	174	2,130	186	18
Iron	8,590*	10,400*	10,500*	22,300*
Nickel	20	75	22	15
Manganese	14,700*	795	14,200	510
Zinc	4,740	1,100	5,680	50
Boron	-	-	-	-
Vanadium	21	21	20	<10
Silver	<0.5	4.0	<0.5	<0.5
(TASK 2)				
Arsenic	13*	14*	14*	20*
Antimony	<1	<1	<1	<1
Selenium	<0.1	<0.1	<0.1	<0.1
Thallium	<0.5	<0.5	<0.5	<0.5
Mercury	2.3*	1.4*	3.5*	<0.1*
Tin	<1	4.2	<1	1.1
Cadmium	2.4*	1.8*	2.9*	0.55*
Lead	204*	1,580*	163*	13*

* - Duplicate analysis was outside QC limits, therefore values should be considered approximate.

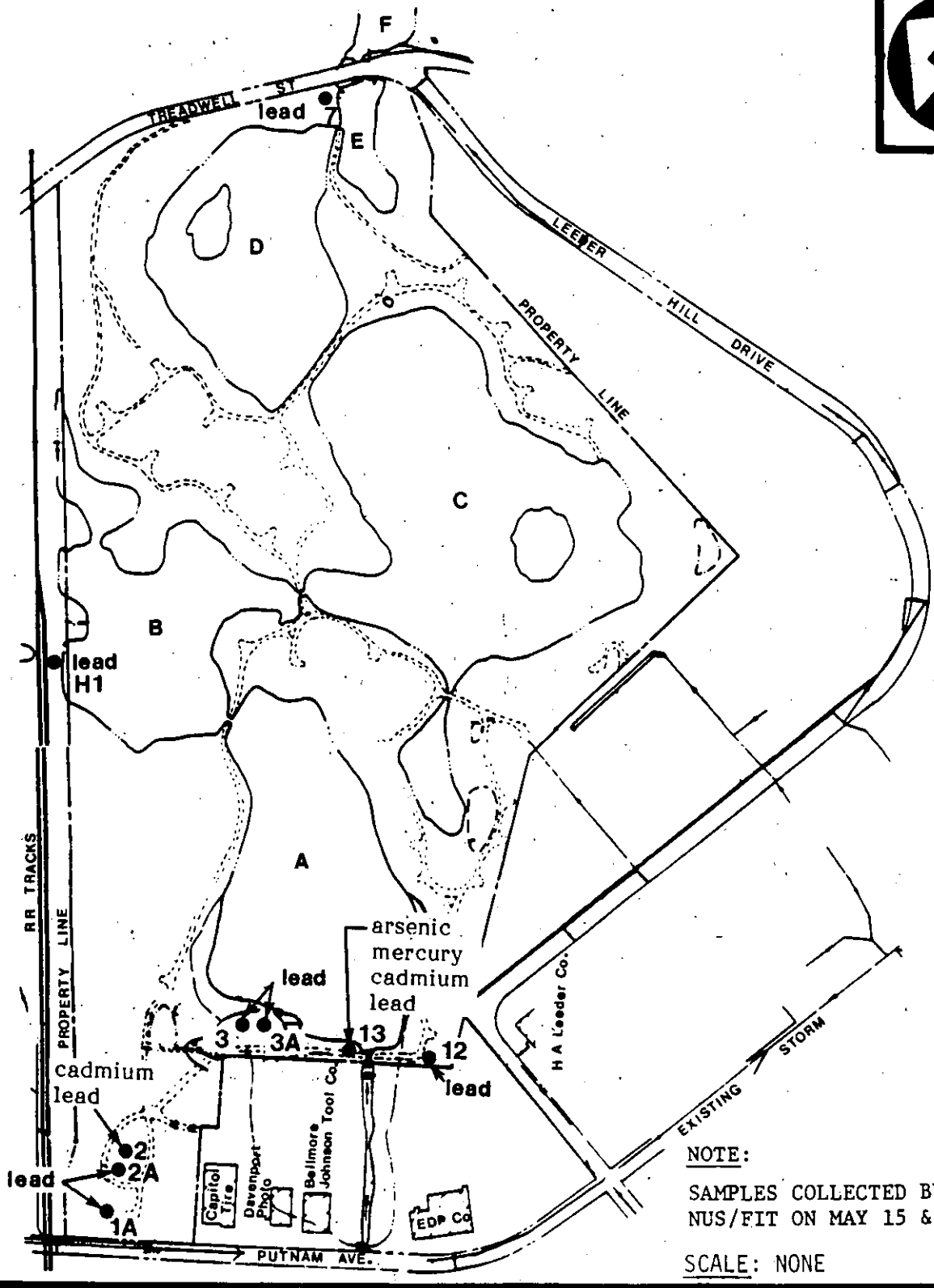


ORGANIC PRIORITY POLLUTANTS
DETECTED IN GROUNDWATER SAMPLES
OLIN SITE
HAMDEN, CONNECTICUT

AUGUST 1984

NUS CORPORATION
A Halliburton Company

FIGURE 7

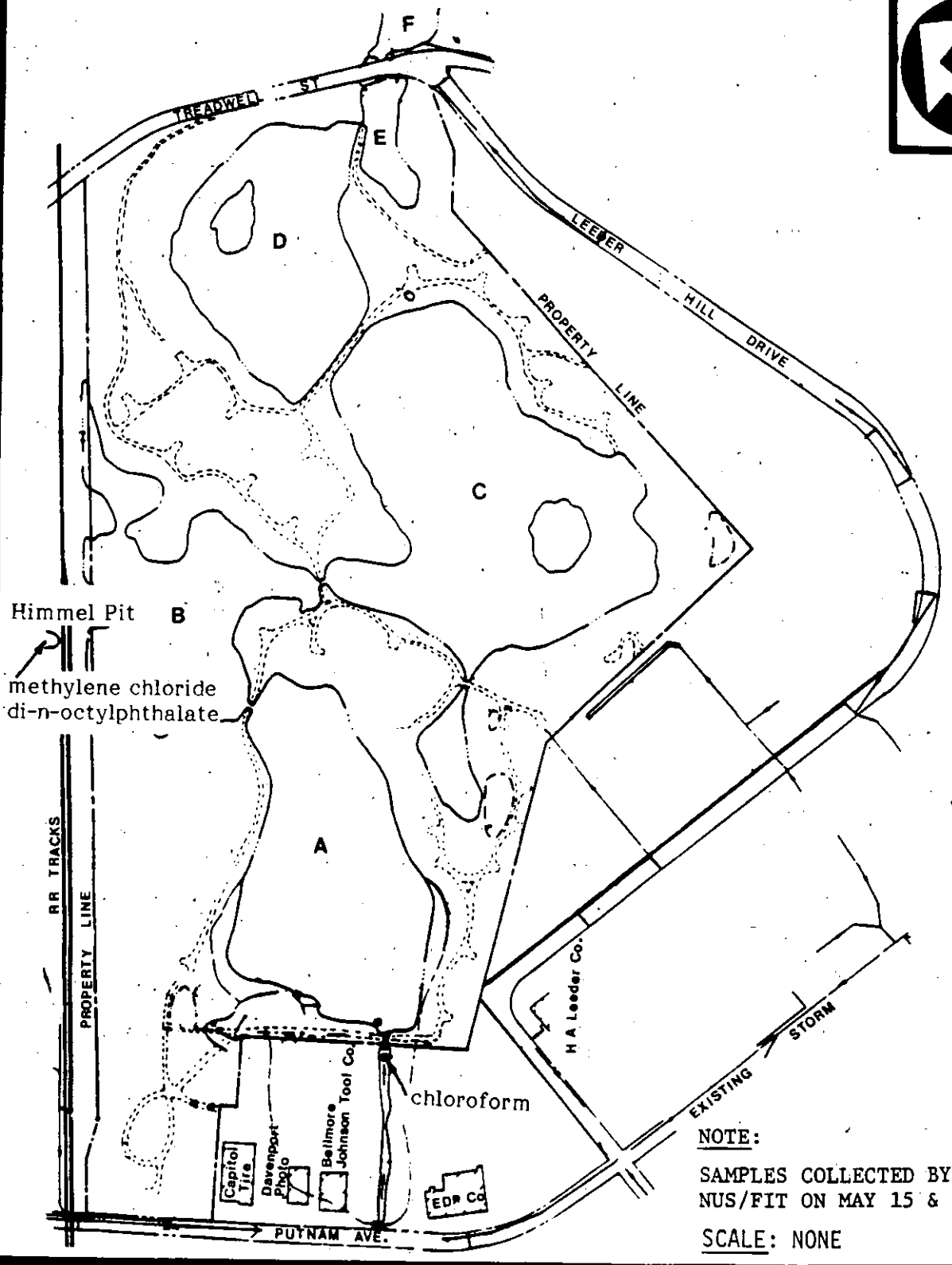


HEAVY METAL CONTAMINANTS
DETECTED IN GROUNDWATER SAMPLES
OLIN SITE
HAMDEN, CONNECTICUT

AUGUST 1984

NUS CORPORATION
A Halliburton Company

FIGURE 8

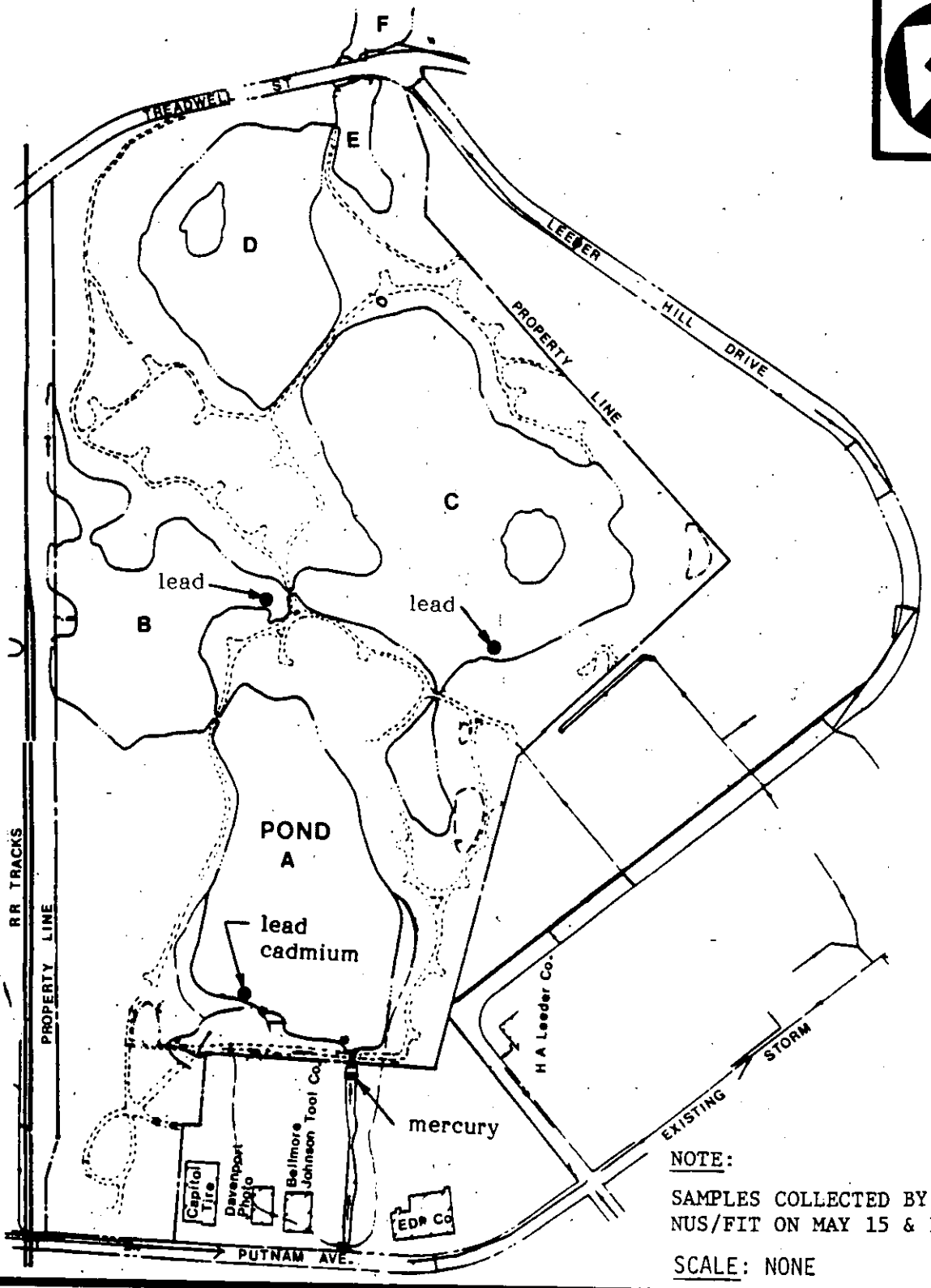


ORGANIC PRIORITY POLLUTANTS DETECTED IN SURFACE WATER SAMPLES

OLIN SITE
HAMDEN, CONNECTICUT
AUGUST 1984

NUS CORPORATION
A Halliburton Company

FIGURE 9



NOTE:

SAMPLES COLLECTED BY NUS/FIT ON MAY 15 & 16, 1984

SCALE: NONE

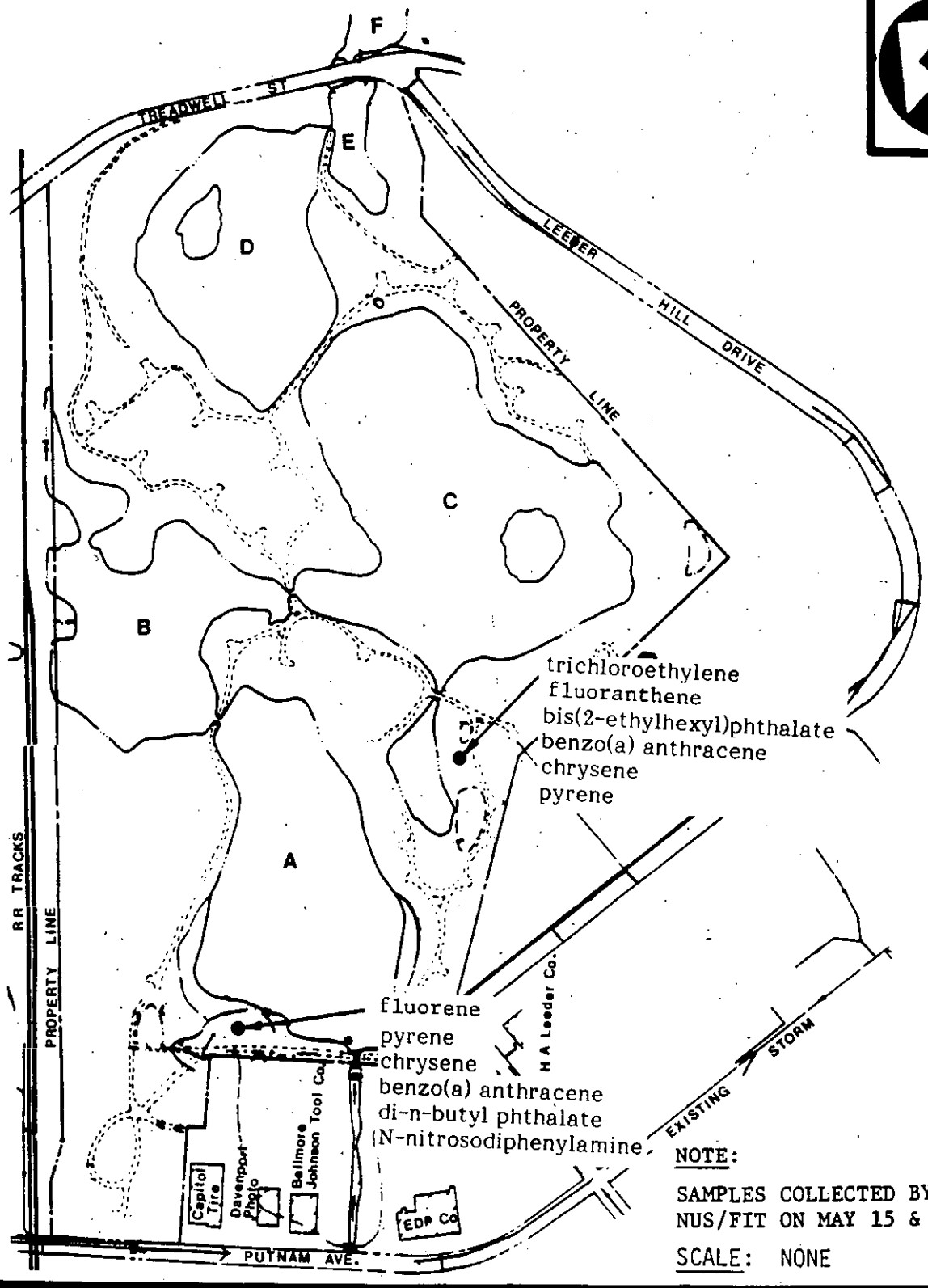
HEAVY METAL CONTAMINANTS DETECTED IN SURFACE WATER SAMPLES

OLIN SITE
HAMDEN, CONNECTICUT

AUGUST 1984

NUS CORPORATION
A Halliburton Company

FIGURE 10



NOTE:

SAMPLES COLLECTED BY NUS/FIT ON MAY 15 & 16, 1984

SCALE: NONE

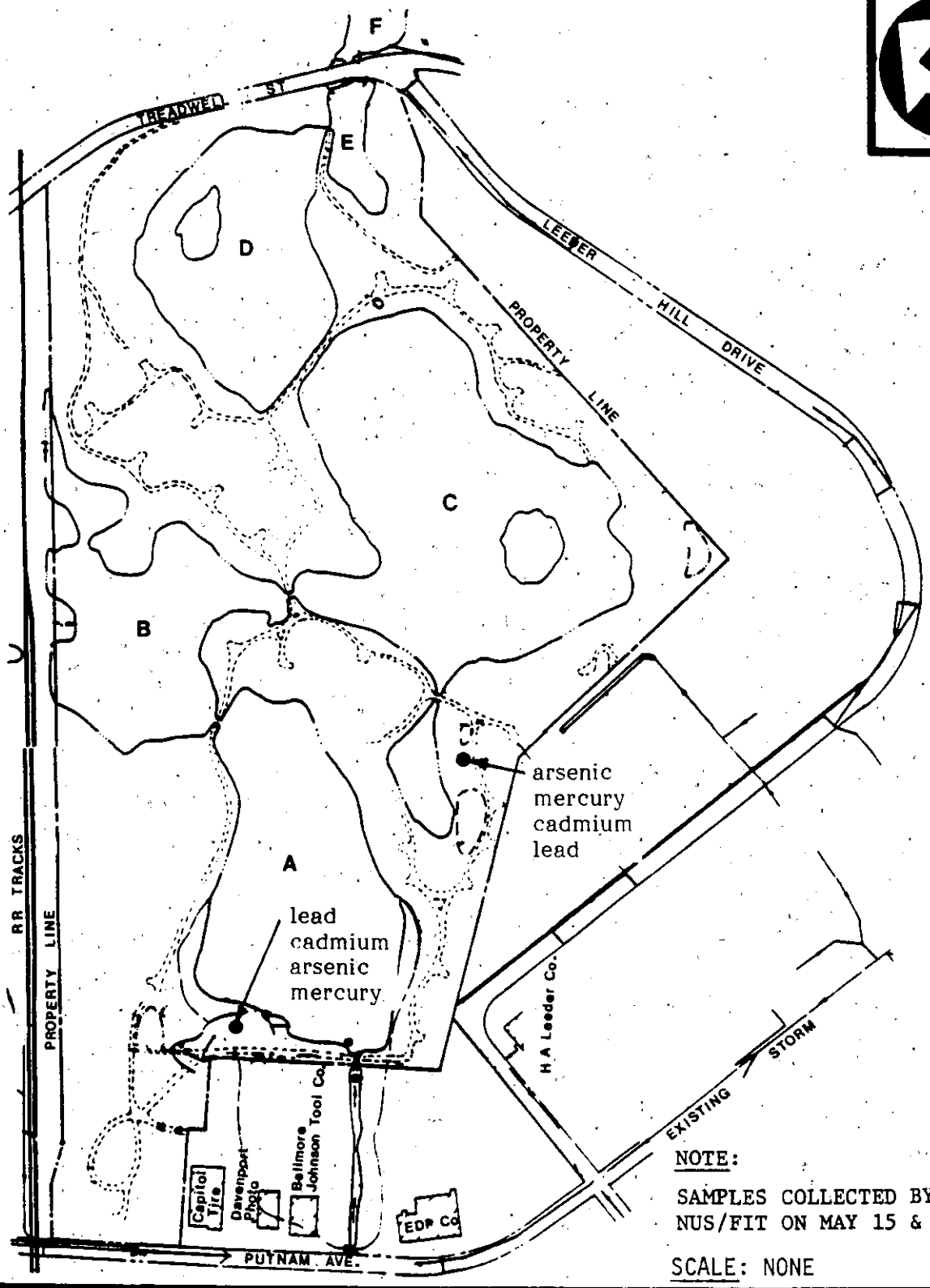
ORGANIC PRIORITY POLLUTANTS DETECTED IN SOIL SAMPLES

OLIN SITE
HAMDEN, CONNECTICUT

AUGUST 1984

NUS CORPORATION
A Halliburton Company

FIGURE 11



HEAVY METAL CONTAMINANTS DETECTED IN SOIL SAMPLES

OLIN SITE
HAMDEN, CONNECTICUT

AUGUST 1984

NUS CORPORATION
A Halliburton Company

FIGURE 12

of the samples collected by NUS essentially confirm previous findings. Volatile organic contamination was detected in the H.A. Leed well and mainly in ERT wells 5 and 12 (which are directly downgradient of the H.A. Leed well), while extractable organic contaminants were detected in the Himmel well, ERT well No. 7 (near Lake Whitney) and the soil near ERT well No. 3 and near the lower portion of Pond C. Inorganic analyses of all samples indicted concentrations of lead significantly above detection limits mainly in ERT well No 13 (1,860 ppb), Pond A (182 ppb), and in soil samples from near ERT well No. 3 (204 ppm) and near the lower portion of Pond C (1,580 ppm). Arsenic (80 ppb), cadmium (15 ppb), and mercury (2.8 ppb) were also detected in ERT-13 while lead (14 ppb) and cadmium (2.6 ppb) were detected in well ERT-2. The soil near ERT-3 also contained levels of zinc (4,740 ppm) and manganese (14,700 ppm) significantly above detection limits while the soil near the lower portion of Pond C contained levels of zinc (1,100 ppm) and copper (2,130 ppm) significantly above detection limits. The soil samples from both sites also contained arsenic (14 ppm), cadmium (1.8-2.9 ppm), and mercury (1.4-3.5 ppm).

6.0 CONCLUSIONS AND RECOMMENDATIONS

Analytical results of groundwater, surface water and soil samples provide evidence that categories of contaminants (volatile organic, extractable organic and inorganics) are concentrated in specific areas on and off the site. Volatile organic compounds (6-230 ppb) appear to be present in the groundwater near the southeast corner of the site and these contaminants possibly originate from an off-site source near the H.A. Leed Company or the Anixter Company. Extractable organic compounds were detected in the soil near ERT well No. 3 (2,000 ppb) and near the lower end of Pond C (450-1,800 ppb). Lead was the only heavy metal detected (samples were not filtered) at significant levels in groundwater (at ERT well No. 13, 1,860 ppb) and in soil (near the lower end of Pond C, 1,580 ppm). Copper (2,130 ppm) and zinc (1,100 ppm) levels were significantly above detection limits in the soil near the lower portion of Pond C while zinc (5,680 ppm) and manganese (14,700 ppm) were significantly above detection limits in the soil near ERT well No. 3.

Results from a surface water sample from Pond D, a groundwater sample from ERT well No. 7 and a surface water sample from Lake Whitney are a possible indication of what contaminants are leaving the site.

In ERT well no. 7, volatile organic analyses indicates that methylene chloride is present at a low concentration (8.7 ppb). Extractable organic analysis indicates that di-n-butyl phthalate (110 ppb) and di-n-octyl phthalate (640 ppb) were detected with only di-n-butyl phthalate being detected on site while di-n-octyl phthalate was only detected in the Himmel pit (21 ppb) and Himmel well (28 ppb) which are both off site. Inorganic analyses (samples were not filtered) indicates that iron levels (56,200 ppb) and lead levels are slightly above detection limits in ERT well No. 7. Analyses of surface water from Pond D and Lake Whitney indicate no significant levels of organic or inorganic priority pollutants.

Groundwater leaving the site at ERT well No. 7 contains some evidence of contaminants leaving the site and these contaminants are methylene chloride (8.7 ppb), di-n-butyl phthalate (110 ppb), di-n-octyl phthalate (640 ppb) and lead (12 ppb). Of these compounds, only di-n-octyl phthalate is detected exclusively off

site at the Himmel Brothers well and pit. Di-n-butyl phthalates (2,000 ppb) and lead (163-1,580 ppm) were detected in on-site soil while trichloroethylene (9.0 ppb) was only detected at slightly above detection limits.

Analyses of soil samples from the former disposal areas indicate that lead and many extractable organic contaminants are present. Lead levels appear to be only slightly above detection limits near ERT well No. 3 (204 ppm) and significantly above detection limits in the soil near the lower end of Pond C (1,580 ppm). Di-n-butyl phthalate, one of the extractable organic contaminants detected leaving the site in the groundwater was detected in the soil near ERT well No. 3 (2,000 ppb). The soil near the lower end of Pond C contained many extractable organic contaminants.

All information obtained from state and local files indicates that Olin was the sole source of waste at this site and on adjacent property that they formerly owned.

The NUS Region I FIT recommends the following actions:

- Installation of borings or monitoring wells upgradient of the H.A. Leed well to determine the source of the volatile organic contaminants.

- Quarterly sampling and priority pollutant analysis on groundwater from ERT well No. 7 and Pond D to indicate whether contaminants are migrating off-site.

- Further investigation of the area on the Anixter property where excavation took place in April to determine if contamination is present and if so, to find its extent.

- Additional soil sampling should be considered in order to further define the extent of contamination and possible soil removal from the contaminated areas should be evaluated.

7.0 REFERENCES

1. U.S. Geological Survey. Topographical Map of New Haven Quadrangle, 7.5 minute series (photorevised 1972).

2. Panaro, John M. and Palermo, Robert S. (NUS). April 6, 1984. Site visit of Olin site.

3. Flint, Richard F. The Surficial Geology of the New Haven and Woodmont Quadrangle. Connecticut Geological and Natural History Survey Quadrangle Report No. 18. 1965.

4. Recny, Christopher J. Map Showing Unconsolidated Materials, New Haven and Woodmont Quadrangles, Connecticut. U.S. Geological Survey MF 557 D. 1976.

5. Schmidt, Fred and Muzyka, John. Personal communication with Barbara Buckley (ERT) January 1980.

6. Panaro, John M. (NUS) and Palermo, Robert S., Fitzgerald, Lawrence J., and Ross, Robert J. (NUS). May 15 and 16, 1984. Site Inspection of the Olin site.

7. Panaro, John M (NUS) and Grabarek, Robert (New Haven Water Co.). April 3, 1984. "Offsite information inquiry." Telecon.

8. Uncontrolled Hazardous Waste Site Ranking System - A User's Manual. June 10, 1982.

9. United States Geological Survey. Water Resources Investigation of Connecticut. 1978.

10. Panaro, John M. (NUS) and Hughes, John (National Climatic Data Service). June 11, 1984. "Climate inquiry."

11. Ginsberg, Marylyn H. Map Showing Depth to Bedrock, New Haven-Woodmont Quadrangles, Connecticut. U.S. Geological Survey MF-557 C. 197.

12. Site Engineers, Inc. Report on Preliminary Soil and Foundation Investigation Proposed Olin Research Center, Hamden, Connecticut. Prepared for A.M. Kinney, Incorporated. April 1974.

13. The Stephen B. Church Co. Driller's logs and other unpublished data for wells serving Whitney Center. 1977.

14. King's Mark Environmental Review Team Report - Olin Powder Farm, Hamden, Connecticut. August 1979.

15. Meade, Daniel B. Groundwater Availability in Connecticut (map). Connecticut Geological and Natural History Survey. 1978.

16. Mazzaferro, David L., Elinor Handman and Mendall Thomas. Water Resources Inventory of Connecticut, Part 8: Quinnipiac River Basin. Prepared by the U.S. Geological Survey in cooperation with the Connecticut Department of Environmental Protection. Connecticut Water Resources Bulletin No. 27. 1979.

17. Panaro, John M. (NUS) and Duff, Paul (Olin Corp.). June 10, 1984. "Olin Site History." Telecon.

18. Panaro, John M. (NUS) and Valintas, Mary (Hamden Assessors Office). June 20, 1984. "Property History." Telecon.

19. Prota, Vincent (Hamden Health Department). March 17, 1966. "Complaint about burning at Olin." Intraoffice memo to Parente, Dr. Leonard.

20. Roper, Barbara L. (Hamden Health Department Clerk). "Summary of Hearing Regarding Difficulties with Property of Olin Mathieson Chemical Corporation". March 23, 1966.

21. Prota, Vincent (Hamden Health Department). April 7, 1966. "Follow-up inspection of Olin." Intraoffice memo to Parente, Dr. Leonard.

22. Panaro, John M. (NUS) and Duff, Paul (Olin Corp.). June 21, 1984. "Olin Site History." Telecon.

23. Ludwig, Frances (New Haven Water Company). April 7, 1981. "Review of Environmental Investigation of Olin's Pine Swamp." Intraoffice memo to McHugh, Richard P. and Schaefer; Otto E.

24. Curtis, Brian (Senior Sanitary Engineer, Water Compliance Unit, Connecticut Department of Environmental Protection). May 26, 1981. "DEP review of ERT Report I." Letter to Wisely, G.T. (Manager, Environmental Regulatory Compliance, Olin Corporation).

25. Curtis, Brian (Senior Sanitary Engineer, Water Compliance Unit, Connecticut Department of Environmental Protection). September 24, 1981. "DEP's intent to issue an abatement order." Letter to Wisely, G.T. (Manager, Environmental Regulatory Compliance, Olin Corporation).

26. Ludwig, Frances (New Haven Water Company). Octobr 23, 1981. "Olin's proposal for additional hydrologic work." Intraoffice memo to file.

27. Duff, Paul (Manager, Energy and Environmental Affairs). December 1, 1981. "Olin's finalization of the second hydrologic investigation." Letter to Curtis, Brian (Senior Sanitary Engineer, Water Compliance Unit, Connecticut Department of Environmental Protection).

28. Grabarek, Robert (Environmental Engineer, New Haven Water Company). December 30, 1981. "Summary of activities during ERT's second investigation." Intraoffice memo to file.

29. Tucker, Dr. Jesse (Director, Connecticut Department of Health Services Laboratory Division). September 7, 1982. "Laboratory analysis of soil samples." Letter report to Harrison E. (Senior Environmental Analyst, Connecticut Department of Environmental Protection).

30. Environmental Research & Technology, Inc. Report for the Phase II Site Investigation at Pine Swamp, Hamden, Connecticut, Olin Corporation. June 1982.

31. Panaro, John M. (NUS) and Mason, Dick (Connecticut Water Compliance Section). June 28, 1984. "Abatement Order to Anixter." Telecon.

32. Environmental Research & Technology, Inc. Report for the Phase I Site Investigation at Pine Swamp, Hamden, Connecticut, Olin Corporation. January 1981.

33. Curtis, Brian (Senior Sanitary Engineer, Water Compliance Unit, Connecticut Department of Environmental Protection). April 11, 1983. "DEP's intent to restore Pine Swamp area groundwater." Letter to Duff, Paul (Manager, Energy and Environmental Affairs, Olin Corporation).

APPENDIX A

COST CENTER:

ACCOUNT NO.:

REM/FIT ZONE CONTRACT
TECHNICAL DIRECTIVE DOCUMENT (TDD)

2. NO.: F1-8305-04

3. PRIORITY:
- [X] HIGH
- [ ] MEDIUM
- [ ] LOW

4. ESTIMATE OF TECHNICAL HOURS: ~~100~~ 150

4A. ESTIMATE OF SUBCONTRACT COST:

5. EPA SITE ID: CTD980521082

5A. EPA SITE NAME: Olin Corp. Hamden, CT

6. COMPLETION DATE: 7/31/83

7. REFERENCE INFO.:
- [ ] YES [X] NO
- [ ] ATTACHED
- [ ] PICK UP

8. GENERAL TASK DESCRIPTION: Complete Site Inspection of site, per contract specifications. Prepare HRS score and documentation record.

9. SPECIFIC ELEMENTS:

	10. INTERIM DEADLINES:
1. Coordinate site visit with CT DEP.	5/23/83
Collect samples & detailed infor. as required.	6/10/83
3. Prepare samples for NLC and shipping, etc. (Assume 4 week turnaround time).	6/10/83
4. Complete observations, recommendations & HRS Score	7/14/83
5. Prepare draft report	7/25/83

11. DESIRED REPORT FORM: FORMAL REPORT [X] LETTER REPORT [ ] FORMAL BRIEFING [ ]

OTHER (SPECIFY):

12. COMMENTS: Coordinate activity with Rick Leighton.

13. AUTHORIZING RPO: Donald R. Smith (SIGNATURE)

14. DATE: 5-12-83

15. RECEIVED BY: Paul F. Clay (CONTRACTOR RPM SIGNATURE)
- [X] ACCEPTED
- [ ] ACCEPTED WITH EXCEPTIONS
- [ ] REJECTED

16. DATE: 5/16/83

Sheet 1 White – FITL Copy
Sheet 2 Canary – DPO Copy
Sheet 3 Pink – Contracting Officer's Copy (Washington, D. C.)
Sheet 4 Goldenrod – Project Officer's Copy (Washington, D. C.)

APPENDIX B

Analyses of groundwater, surface water and sediment samples from the Olin site. Results extracted from Environmental Research and Technology Phase I Site Investigation at Pine Swamp, Hamden, Connecticut, Olin Corporation, January 1981.

BACKGROUND GROUND WATER QUALITY

ORGANIC COMPOUNDS

(concentration ppb or ug/l)

BASE/NEUTRAL COMPOUNDS*	Field Blank	Leed	Himmel	ERT-5	ERT-1	ERT-1A[1]
di-n-butyl phthalate					5	NA
bis (2-ethylhexyl) phthalate	8		25	3	20	NA
VOLATILES**						
methylene chloride	4		2		8	3
trichlorofluoromethane		20		34		
1,2-trans-dichloroethylene		1		710		
1,1-dichloroethane				3		
1,1,1-trichloroethane		29		28		
1,2-dichloropropane		16				
trichloroethylene		16		500		
benzene				2		
tetrachloroethylene				2400		
toluene	7	6	6			
chlorobenzene				89		

*Analyses performed June 1980.

**Net concentration shown equals sample concentration minus laboratory blank concentration. Analyses performed December, 1980

[1]Base/neutral compounds not analyzed in June 1980 sample at ERT-1A.

SEDIMENT DATA

STATIONS SAMPLED FOR LIST A PARAMETERS

Inorganic Parameters*	#3	#5	#11	Field Bank
Tot. Vol. Solids. mg/g	690	790	700	
pH	6.4	6.9	6.5	
BOD5	4590	3170	1830	
COD. mg/g	380	370	260	
Total cyanide	<1	<1	<1	
Metals				
Arsenic	2.7	8.1	1.9	
Antimony	<0.2	<0.2	<0.2	
Beryllium	<3	<3	<3	
Cadmium	2.5	1.5	<1	
Chromium	26	22	7.5	
Copper	70	85	15	
Lead	686	750	155	
Manganese	80	88	76	
Mercury	0.30	0.30	0.19	
Nickel	21	33	9.0	
Selenium	<0.4	<0.4	<0.4	
Silver	<5	<5	<5	
Thallium	<5	<5	<5	
Zinc	70	42	13	
Moisture %	82	73	76	
Priority Pollutants **				
diethyl phthalate	32	64	40	ND
anthracene and/or phenanthrene	40	125	40	ND
di-n-butyl phthalate	160	168	216	ND
fluoranthene	72	240	56	ND
pyrene	64	208	48	ND
bis (2-ethylhexyl) phthalate	24	24	32	8
benzo(a) anthracene and/or chrysene	120	288	88	ND
benzo(k) fluoranthene and/or 3.4 benzo(b) fluoranthene	200	440	144	ND
benzo(a) pyrene	ND	424	ND	ND
ideno (1,2,3,-cd) pyrene	ND	144	56	ND
methylene chloride	252	216	61	16
toluene			9	5

*Values in ug/g (ppm) dry weight basis, unless otherwise noted
**ND - not detected; all values ug/kg or ppb dry weight basis

SEDIMENT DATA

LIST B PARAMETERS

(Results in ppm Dry Weight Basis unless otherwise noted)

Parameter	Sediment Sampling Locations						
	2	4	6	7	8	9	10
Tot. Vol. Solids, mg/g	350	810	690	400	640	610	650
pH	6.5	6.5	7.3	7.1	7.0	6.4	6.9
BOD5	4790	2760	1660	2690	4320	2140	2150
COD, mg/g	780	250	280	270	320	370	320
Total cyanide	<1	<1	<1	<1	<1	<1	<1
Metals							
Arsenic	2.7	1.8	2.0	1.0	2.0	1.0	1.3
Antimony	<0.2	25	<0.2	<0.2	<0.2	<0.2	<0.2
Cadmium	2.5	<1	<1	<1	2.0	<1	1.2
Chromium	45	7.5	7.5	12	15	15	15
Copper	105	53	31	14	50	20	28
Lead	552	211	321	140	212	70	121
Manganese	54	154	39	30	94	85	53
Mercury	0.80	1.2	0.26	0.15	0.19	<0.1	0.16
Nickel	25	17	13	11	21	13	23
Selenium	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Silver	5	<5	<5	<5	<5	<5	<5
Zinc	102	21	19	10	46	14	22
Moisture %	91	67	83	80	83	81	81

BACKGROUND GROUNDWATER QUALITY

INORGANIC COMPOUNDS

	South West			South			East	West		
	Dadio	ERT-1	ERT-1A	ERT-8	Leed	ERT-5	Whitney*	Himmel	ERT-H1	ERT-H1A
Inorganic Parameters (mg/l except as noted)										
Temperature (°C)	NA**	14.1	13.8	12.0	NA	11.8	NA	NA	13.8	16.3
Specific Conductance (umhos/cm)	NA	437	367	256	NA	530	NA	NA	462	462
pH	NA	7.16	6.12	8.06	NA	6.97	NA	NA	6.78	7.00
Total Diss. Solids	NA	185	NA	NA	180	205	NA	150	NA	NA
Total Hardness	NA	167	NA	NA	100	200	(200)	173	NA	NA
Diss. Org. Carbon	3	17	7	5	32	33	<1	39	12	7
Chloride	NA	41	NA	NA	34	35	(35)	43	NA	NA
Nitrate-N	NA	3.2	NA	NA	3.2	0.23	NA	3.3	NA	NA
Total Phenol	NA	<0.05	NA	NA	<0.05	0.074	NA	<0.05	NA	NA
Total Cyanide	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	0.071
Metals										
Arsenic	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Antimony	NA	<0.005	NA	NA	<0.005	<0.005	NA	<0.005	NA	NA
Barium	0.086	0.068	0.074	<0.05	0.23	0.26	0.15	0.064	0.14	0.18
Beryllium	NA	<0.02	NA	NA	<0.02	<0.02	NA	<0.02	NA	NA
Cadmium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	0.09	<0.05	<0.05
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.56 (0.02)	<0.05	<0.05	<0.05
Manganese	<0.05	<0.05	<0.05	<0.05	0.07	3.7	<0.05	<0.05	0.07	0.25
Mercury (ug/l)	0.71	<0.5	0.50	1.0	0.55	<0.5	<0.5	<0.5	0.50	0.5
Nickel	NA	<0.1	NA	NA	<0.1	<0.1	NA	<0.1	NA	NA
Selenium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Silver	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sodium	NA	18	NA	NA	18	10	(17)	18	NA	NA
Thallium	NA	<0.05	NA	NA	<0.05	<0.05	NA	<0.05	NA	NA
Zinc	0.30	0.20	0.21	0.12	<0.05	0.08	<0.07	<0.05	0.01	0.10

*Data in parentheses from Conn. Dept. of Health 1979.
**NA-no analysis

OFF-SITE SURFACE WATER QUALITY DATA

(all values in ppm or mg/l)

Parameter	Inputs to the Pond System #1	Inputs to the Pond System #13	Lake Whitney Downstream Station #12
Diss. Org. Carbon	5	36	13
Total Cyanide	<0.009	<0.009	<0.009
Oil & Grease	<1	<1	2
Metals			
Arsenic	<0.005	<0.005	<0.005
Antimony	<0.005	<0.005	<0.005
Barium	0.064	0.075	<0.05
Cadmium	<0.01	<0.01	<0.01
Chromium	<0.05	<0.05	<0.05
Copper	<0.05	<0.05	<0.05
Lead	0.084	<0.05	<0.05
Manganese	0.50	<0.05	0.13
Mercury ug/l	<0.5	<0.5	<0.5
Nickel	<0.1	<0.1	<0.1
Selenium	<0.01	<0.01	<0.01
Silver	<0.05	<0.05	<0.05
Zinc	0.18	0.07	<0.05

ON SITE GROUND WATER QUALITY

INORGANIC COMPOUNDS*

Parameter	ERT 2	ERT 2A	ERT 3	ERT 3A	ERT 4	ERT 6	ERT 7
Temperature (^{o}C)	13.4	13.2	13.3	13.1	13.8	12.2	11.9
Specific Conductance (umhos/cm)	410	445	671	700	667	873	275
pH	6.14	6.02	7.26	7.30	6.83	7.17	7.72
Total Dissolved Solids	200	150	250	260			
Total Hardness	127	120	247	253			
Dissolved Organic Carbon	39	37	31	21	40	21	<1
Chloride	54	60	50	50			
Nitrate-N	4.6	1.2	0.51	<0.20			
Total Phenol	<0.05	<0.05	<0.05	<0.05			
Total Cyanide	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
Metals							
Arsenic	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Antimony	<0.005	<0.005	<0.005	<0.005			
Barium	0.099	0.057	0.18	0.11	0.086	0.23	0.075
Beryllium	<0.02	<0.02	<0.02	<0.02			
Cadmium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	<0.05	<0.05	<0.05	<0.05	<0.05		
Copper	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Manganese	<0.05	21	0.53	0.27	0.41	0.18	<0.05
Mercury (ug/l)	0.50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel	<0.1	<0.1	<0.1	<0.1			
Selenium	<0.01	<0.01	<0.01	<0.01	0.027	0.018	<0.01
Silver	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sodium	23	36	31	14			
Thallium	<0.05	<0.05	<0.05	<0.05			
Zinc	0.23	0.42	0.18	0.14	0.15	0.59	0.10

*All data in ppm, except where noted.

SURFACE WATER QUALITY DATA

STATIONS SAMPLED FOR LIST A PARAMETERS

Inorganic Parameters*	Surface Water Sampling Locations 3	5	11	Field Blank
Total Diss. Solids	115	140	160	
Total Susp. Solids	8	8	8	
Total Hardness	80	80	100	
Diss.Org. Carbon	35	46	34	
Chloride	20	26	25	
Nitrate-N	0.28	0.24	0.22	
Ammonia-N	0.19	0.14	0.19	
Total Cyanide	<0.009	<0.009	<0.009	
Oil & grease	<1	<1	2	
Metals				
Arsenic	<0.005	<0.005	<0.005	
Antimony	<0.005	<0.005	<0.005	
Barium	0.061	0.095	0.083	
Beryllium	<0.02	<0.02	<0.02	
Cadmium	<0.01	<0.01	<0.01	
Chromium	<0.05	<0.05	<0.05	
Copper	<0.05	<0.05	<0.05	
Lead	<0.05	<0.05	<0.05	
Manganese	0.17	0.20	0.16	
Mercury ug/l	0.93	1.6	<0.5	
Nickel	<0.1	<0.1	<0.1	
Selenium	<0.01	<0.01	<0.01	
Silver	<0.05	<0.05	<0.05	
Sodium	14	9	8	
Thallium	<0.05	<0.05	<0.05	
Zinc	<0.05	<0.05	<0.05	

Priority Pollutants **				
Base/Neutral Compounds				
bis (2-ethylhexyl) phthalate	2	10	5	8
Volatile Compounds				
methylene chloride		4	23	4
Toluene		4	4	

*All values in ppm unless otherwise noted

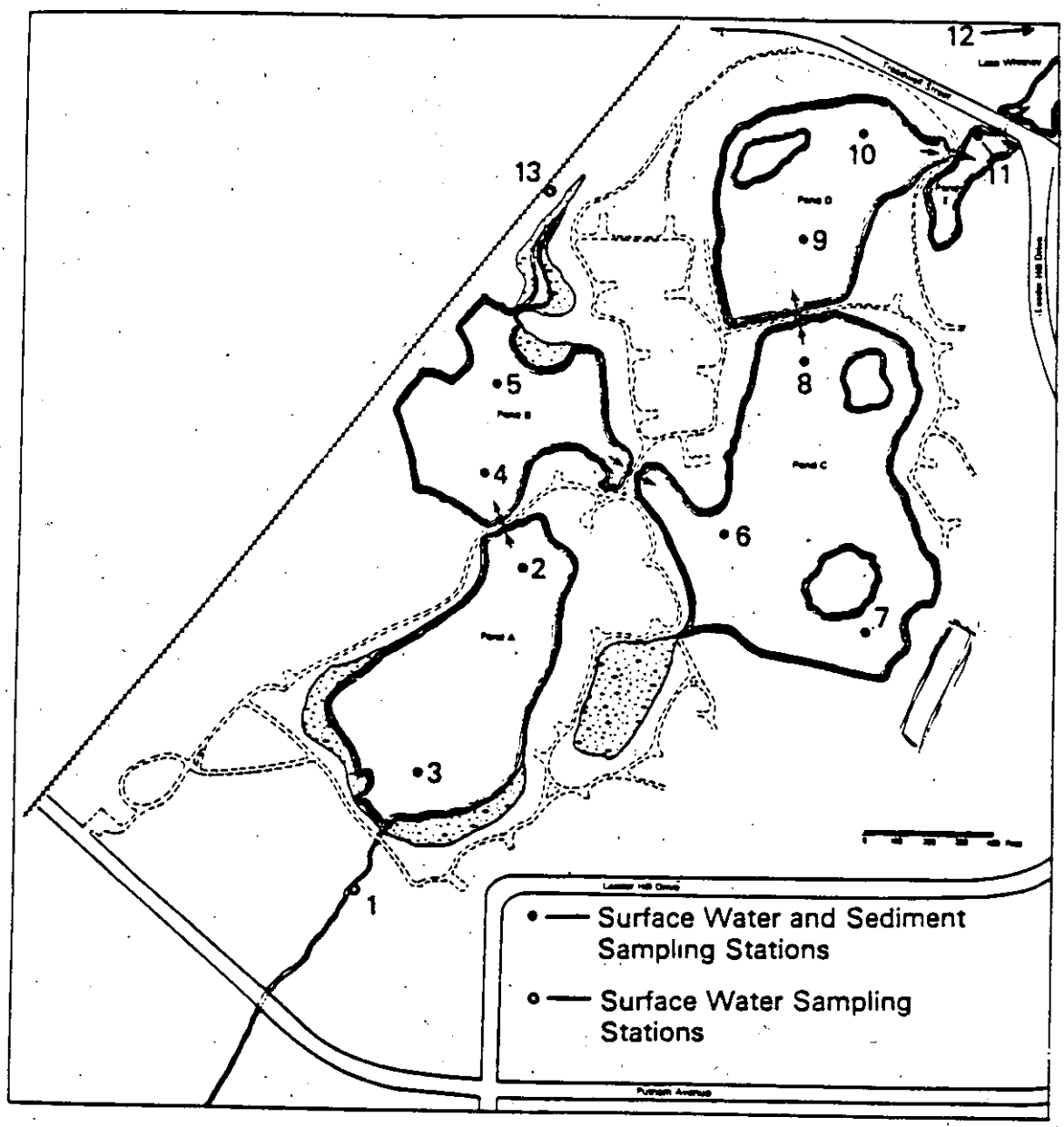
**Base/Neutral performed, June 1980; volatile analyses performed, December 1980. All values in ppb

ON-SITE SURFACE WATER QUALITY DATA

LIST B PARAMETERS

(Results in ug/ml (ppm) unless otherwise noted)

Parameter	Station Location						
	2	4	6	7	8	9	10
Diss. Org. Carbon	59	39	56	68	48	59	31
Total Cyanide	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
Oil & Grease	10	<1	15	5	3	4	7
Metals							
Arsenic	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Antimony	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.14	0.11	0.090	0.11	0.078	0.074	0.058
Cadmium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead	0.056	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Manganese	0.20	0.17	0.19	0.11	0.18	0.16	0.17
Mercury ug/l	0.87	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Silver	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Zinc	0.16	0.07	<0.05	<0.05	0.06	<0.05	<0.05



NOTE: Base map from ERT phase II report, June 1982

Surface Water Quality and Sediment Sampling Stations

Note: Surface Water Quality Station No. 12 (not shown in this figure) sampled at Lake Whitney

APPENDIX C

Analyses of groundwater, surface water, sediments and soil samples from the Olin site. Results extracted from Environmental Research and Technology Phase II Site Investigation at Pine Swamp, Hamden, Connecticut, Olin Corporation, June 1982.

NON-PRIORITY POLLUTANT ORGANIC COMPOUNDS

DETECTED IN GROUND-WATER SAMPLES

Sample Location	Constituent Concentrations (ug/l)			
	Acetone	Tetrahydrofuran	Ethyl Ether	Tertiary-Butyl Alcohol
ERT 2	ND	200	ND	ND
ERT 2A	ND	95	ND	ND
ERT 3	ND	150	ND	5300
ERT 3A	.2 200	120	ND	670
ERT 15	.6 570	50	ND	ND
ERT 16	220	1300	ND	ND
ERT 17	ND	320	ND	350
ERT 20	ND	30	≤ 300	700
Davenport	ND	45	ND	890

Notes: 1. Concentrations are reported in micrograms per liter (ug/l). These units are equivalent to parts per billion (ppb).

2. In this table, ND signifies that a peak was not apparent in the GC/MS scan.

METAL CONCENTRATIONS IN REGIONAL AQUIFER BELOW WASTE (mg/l)

ERT Lab No.	Well No.	Screen Depth	Cd	Cr	Hg	Mn	Pb	Zn	pH
11962	3	65	ND	ND	ND	0.41	ND	0.007	7.8
11960	3A	35	ND	ND	ND	0.30	ND	0.036	7.5
11965	13	5	ND	ND	ND	0.54	ND	0.23	6.7
11967	14	4	0.005	ND	0.0003	1.3	ND	1.6	5.9
11969	15	8	ND	ND	ND	1.0	ND	0.021	6.8
11970	16	10	ND	ND	0.0002	5.8	ND	0.007	6.6
11972	18	15	ND	ND	ND	0.021	ND	0.012	7.0
11974	20	15	ND	ND	0.0004	6.8	ND	0.10	6.7
11975	22	5	ND	ND	0.0002	0.14	ND	0.017	6.8
Detection Limit			0.005	0.05	0.0002	0.01	0.10	0.005	

Notes:

1. pH was measured in the field using a Hydrolab 8000.
2. Concentrations are reported in milligrams per liter (mg/l). These units are equivalent to parts per million (ppm).
3. ERT 13 and ERT 14 are screened in fill, but the silt and clay layer is absent at both locations. Thus water elevations reflect that of the regional aquifer.

METAL CONCENTRATIONS
FROM
VARIOUS MONITORING WELLS
ALL DATA IN ppm

Well No.	Cd	Cr	Hg	Mn	Pb	Zn
3	N.D.	N.D.	N.D.	.41	N.D.	.007
3A	N.D.	N.D.	N.D.	.30	N.D.	.036
4	N.D.	N.D.	N.D.	.37	N.D.	.018
5	N.D.	N.D.	N.D.	3.2	N.D.	.055
7	N.D.	N.D.	.0012	N.D.	N.D.	.017
9	N.D.	N.D.	.0002	16.0	N.D.	.33
12	N.D.	N.D.	N.D.	.68	N.D.	.052
13	N.D.	N.D.	N.D.	.54	N.D.	.23
14	.005	N.D.	.0003	1.3	N.D.	1.6
15	N.D.	N.D.	N.D.	1.0	N.D.	.021
16	N.D.	N.D.	.0002	5.8	N.D.	.007
17	N.D.	N.D.	N.D.	.82	0.18	.25
18	N.D.	N.D.	N.D.	.021	N.D.	.012
19	N.D.	N.D.	.0002	2.9	N.D.	.91
20	N.D.	N.D.	.0004	6.8	N.D.	.10
22	N.D.	N.D.	.0002	0.14	N.D.	.017
23	.005	N.D.	.0004	21	N.D.	6.9
24	.006	N.D.	.0003	17	N.D.	1.2
29	N.D.	N.D.	N.D.	.12	N.D.	.022
30	N.D.	N.D.	N.D.	.056	N.D.	.014
31	N.D.	N.D.	N.D.	.014	N.D.	.015
Detection Limit from	.005	.05	.0002	.01	.10	.005

ANALYTICAL RESULTS FOR SURFACE WATER SAMPLES

Metals (mg/l)

ERT Lab No.	Sample No.	Sample Location	Cd	Cr	Hg	Mn	Pb	Zn	pH
12718	SW-1	brook at Putnam Ave.	ND	ND	ND	0.44	ND	0.22	7.3
12719	2	brook at Pond A	ND	ND	ND	0.53	ND	0.14	7.6
12720	3	Pond A at brook	ND	ND	ND	0.45	ND	0.13	7.0
12721	4	Pond A near ERT-18	ND	ND	ND	1.9	ND	5.2	6.8
12722	5	Pond E at Treadwell	ND	ND	ND	0.14	ND	0.033	6.9
Detection limit			0.005	0.05	0.0002	0.01	0.10	0.005	

Organic Compounds (ug/l)

Sample No.	Concentration	Constitutent
SW-5	11	1,1,1-trichloroethane
Detection Limit	10	

Notes:
1. Metal concentrations are reported in milligrams per liter (mg/l). These units are equivalent to parts per million (ppm).
2. Organic compound concentrations are reported in micrograms per liter (ug/l). These units are equivalent to parts per billion (ppb).

METAL CONCENTRATIONS IN REGIONAL AQUIFER

NOT BELOW WASTE (mg/l)

ERT Lab No.	Well No.	Screen Depth	Cd	Cr	Hg	Mn	Pb	Zn	pH
11958	4	60	ND	ND	ND	0.37	ND	0.018	6.9
11959	5	65	ND	ND	ND	3.2	ND	0.005	7.1
11980	7	60	ND	ND	0.0012	ND	ND	0.017	6.9
11978	12	13	ND	ND	ND	0.68	ND	0.052	6.7
11979	29	25	ND	ND	ND	0.12	ND	0.022	6.6
11983	30	12	ND	ND	ND	0.056	ND	0.014	6.6
11982	31	9	ND	ND	ND	0.014	ND	0.015	6.5
11981	Whitney[1]	NA	ND	ND	ND	ND	ND	0.021	NA
11961	Davenport	NA	ND	ND	ND	0.72	ND	ND	7.1
Detection Limit			0.005	0.05	0.0002	0.01	0.10	0.005	

Notes:

1. Field measurements could not be taken nor could sample be filtered due to discharge configuration of the well.
2. pH was measured in the field using a Hydrolab 8000.
3. Concentrations are reported in milligrams per liter (mg/l). These units are equivalent to parts per million (ppm).

METAL CONCENTRATIONS IN PERCHED GROUND WATER (mg/l)

ERT Lab No.	Well No.	Screen Depth	Cd	Cr	Hg	Mn	Pb	Zn	pH
11968	9	5	ND	ND	0.0002	16	ND	0.33	6.3
11971	17	7	ND	ND	ND	0.82	0.18	0.25	6.5
11973	19	5	ND	ND	0.0002	2.9	ND	0.91	7.2
Not sampled	21								
11976	23	5	0.005	ND	0.0004	21	ND	6.9	6.9
11977	24	4	0.006	ND	0.0003	17	ND	1.2	7.3
Detection Limit			0.005	0.05	0.0002	0.01	0.10	0.005	

Notes:

1. pH was measured in the field using a Hydrolab 8000.
2. Concentrations are reported in milligrams per liter (mg/l). These units are equivalent to parts per million (ppm).

METAL CONCENTRATIONS IN BOTTOM SEDIMENTS (ppm)

Metal	Concentration Range in Lakes Whitney & Saltonstall[1]	Concentration in Pond A
Cadmium (Cd)	1-2.7	1.2
Chromium (Cr)	70-100	19
Lead (Pb)	600-1100	62
Manganese (Mn)	1500-2300	150
Mercury (Hg)[2]	0.01-0.3	0.20
Zinc (Zn)	350-650	550

1 Bertine and Mendick (1973).
2 Bowen (1966).

CONCENTRATIONS IN THE EXTRACT FROM EP TOXICITY TEST (mg/l)

ERT Lab No.	Boring No.	Sample No.	Sample Depth	Cd	Cr	Cr^{+6}	Hg	Mn	Pb	Zn	pH
Waste Containing Batteries											
11999	ERT9	SS2	2.0-4.0	0.10	ND	ND	0.0002	150	12	120	6.4
11997	ERT11	SS3	4.0-5.0	0.42	ND	ND	0.0006	150	160	820	7.2
11991	ERT18	SS2	2.5-4.5	1.2	ND	ND	0.0002	170	14	1000	9.4
11989	ERT20	SS1A	1.3-2.0	0.16	ND	ND	ND	140	1.2	170	7.4
11985	ERT23	SS1A	0.7-2.0	0.088	ND	ND	ND	100	15	170	7.2
Textile Waste											
11986	ERT23	SS3B	8.8-9.3	0.014	ND	ND	ND	62	1.5	25	7.4
Peat or Organic Silt Below Waste											
12000	ERT9	SS3	4.0-6.0	ND	ND	ND	0.0027	8.3	0.19	5.9	6.7
11996	ERT11	SS3A	5.0-6.0	ND	ND	ND	ND	1.3	ND	0.42	7.3
11994	ERT17	SS3B	7.0-7.2	ND	ND	ND	ND	12	0.25	0.13	5.8
11993	ERT17	SS4	8.0-8.5	ND	ND	ND	ND	0.92	ND	0.21	6.6
11990	ERT18	SS3	4.0-4.5	0.081	ND	ND	0.0003	130	0.48	150	6.8
11988	ERT20	SS3	4.0-4.3	ND	ND	ND	ND	8.5	ND	2.7	7.5
Sand and Gravel Below Waste											
12001	ERT9	SS5	8.0-10.0	ND	ND	ND	0.0002	1.3	ND	0.37	8.0
1995	ERT11	SS4	6.0-8.0	ND	ND	ND	0.0011	0.25	ND	0.17	8.2
1987	ERT23	SS3C	9.3-10.0	ND	ND	ND	0.0004	11	ND	1.5	8.3
Peat or Organic Silt Not Below Waste											
11998	ERT10	SS2A	2.8-3.0	0.023	ND	ND	ND	48	0.19	48	7.4
11992	ERT13	SS4	6.0-6.5	ND	ND	ND	ND	1.2	ND	1.9	8.4
11984	ERT22	SS2	2.0-2.3	ND	ND	ND	ND	1.6	ND	ND	7.8
Detection Limit				0.005	0.05	0.01	0.0002	0.01	0.10	0.005	

Note: Concentrations are reported in milligrams per liter (mg/l). These units are equivalent to parts per million (ppm).

ON-SITE BACKGROUND CONCENTRATIONS
FOR SOIL DETERMINED BY EP TOXICITY TEST

Constituent	Concentration (ppm)
Cadmium	ND
Chromium	ND
Hexavalent Chromium	ND
Lead	ND
Manganese	1.2-1.6
Mercury	ND
Zinc	ND-1.9

Notes:

1. ND - not dectected.

2. Background concentrations ranges are derived from values considered most representative of soil not below waste; See Table 4-5

SOIL SAMPLE EP TOXICITY TESTS
FOR
MONITORING WELL CORE SAMPLES
ALL DATA IN ppm

Well No.	Depth (Feet)	Soil ph	Cd	Cr_{Tot}	Cr_6	Hg	Mn	Pb	Zn
9	2.0 to 4.0	6.4	.1	N.D.	N.D.	.0002	150	12	120
9	4.0 to 6.0	6.7	N.D.	N.D.	N.D.	.0027	8.3	.19	5.9
9	8.0 to 10.0	8.0	N.D.	N.D.	N.D.	.0002	1.3	N.D.	.37
10	2.8 to 3.0	7.4	.023	N.D.	N.D.	N.D.	48	.19	48
11	4.0 to 5.0	7.2	.42	N.D.	N.D.	.0006	150	160	820
11	5.0 to 6.0	7.3	N.D.	N.D.	N.D.	N.D.	1.3	N.D.	.42
11	6.0 to 8.0	8.2	N.D.	N.D.	N.D.	.0011	.25	N.D.	.17
13	6.0 to 6.5	8.4	N.D.	N.D.	N.D.	N.D.	1.2	N.D.	1.9
17	7.0 to 7.2	5.8	N.D.	N.D.	N.D.	N.D.	12	.25	.13
17	8.0 to 8.8	6.6	N.D.	N.D.	N.D.	N.D.	.92	N.D.	.21
18	2.5 to 4.5	9.4	1.2	N.D.	N.D.	.0002	170	14	1000
18	4.0 to 4.5	6.8	.081	N.D.	N.D.	.0003	130	.48	150
20	1.3 to 2.0	7.4	.16	N.D.	N.D.	N.D.	140	1.2	170
20	4.0 to 4.3	7.5	N.D.	N.D.	N.D.	N.D.	8.5	N.D.	2.7
22	2.0 to 2.3	7.8	N.D.	N.D.	N.D.	N.D.	1.6	N.D.	N.D.
23	0.7 to 2.0	7.2	.088	N.D.	N.D.	N.D.	100	15	170
23	8.8 to 9.3	7.4	.014	N.D.	N.D.	N.D.	62	1.5	25
23	9.3 to 10.0	8.3	N.D.	N.D.	N.D.	.0004	11	N.D.	1.5
Detection Limit			.005	.05	.01	.002	.01	.01	.005

APPENDIX D

Analytical results for groundwater and soil from the Olin site by the Connecticut DEP..

STATE OF CONNECTICUT'S GROUNDWATER ANALYSES
(Concentrations expressed in parts per billion-ppb)

Sample Location	Date Sampled	Priority Pollutant Volatile Organic Contaminants
Davenport Photo well	11-06-81	ND
	11-23-81	chlorobenzene-23
	12-10-81	ND
ERT Well 2	12-09-81	1,2-trans dichloroethylene-11
ERT Well 2A	12-09-81	1,2-trans dichloroethylene-10
ERT Well 3	12-09-81	tetrachloroethylene-trace
ERT Well 3A	12-09-81	tetrachloroethylene-trace
	04-13-82	ND
ERT Well 4	12-09-81	1,2-trans dichloroethylene-36, trichloroethylene-trace, chlorobenzene-8
ERT Well 5	12-09-81	1,2-trans dichloroethylene-660, trichloroethane-220, trichloroethylene-400, tetrachloroethylene-2700, chlorobenzene-530, chloroform-1(methylene chloride-39, 1,2-dichloroethane-35
ERT Well 7	12-09-81	ND
ERT Well 9	12-11-81	ND
ERT Well 13	12-11-81	trichloroethylene-6
ERT Well 14	12-11-81	ND
ERT Well 15	12-11-81	ND
ERT Well 16	12-15-81	ND
	04-13-82	ND
ERT Well 17	12-15-81	ND
ERT Well 20	12-16-81	ND
	04-13-82	ND
ERT Well 22	12-16-81	ND
ERT Well 23	12-16-81	ND
ERT Well 24	12-16-81	ND
ERT Well 29	12-16-81	trichloroethylene-24, tetrachloroethylene-21
	04-13-82	1,2-trans-dichloroethylene-15, trichloroethylene-20,tetrachloroethylene-18
ERT Well 30	12-16-81	ND
ERT Well 31	12-16-81	ND
ERT Well 12	12-16-81	1,2-trans dichloroethylene-32, trichloroethylene-9, tetrachloroethylene-14
Whitney Center Well	12-16-81	ND

STATE OF CONNECTICUT'S ANALYSES OF SOIL
ON THE ANIXTER PROPERTY (COLLECTED 8-16-82)

Sample Location	Volatile Organic Contaminants (ppb)
Anixter property at curve of Leeder Hill Drive (3-6")	benzene-7 chlorobenzene-600 1,1-dichloroethylene-50 ethanol-4,000 tetrachloroethylene-270 toluene-50 1,1,1-trichloroethane-640 trichloroethylene-60 trichlorofluoromethane-700 1,1-dichloroethane-60

APPENDIX E

Organic Priority Pollutants

U.S. ENVIRONMENTAL PROTECTION AGENCY - CLP Sample Management Office
P.O. Box 818, Alexandria, Virginia 22313 - 703/557-2490

Sample Number

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: _____ Case No: _____

Lab Sample I.D. No: _____ QC Report No: _____

Multiply Detection Limits by 1 ☐ or 10 ☐ (Check Box for Appropriate Factor)

ACID COMPOUNDS

PP #	CAS #		ug/l or ug/kg (circle one)
(21A)	88-06-2	2,4,6- trichlorophenol	
(22A)	59-50-7	p-chloro-m-cresol	
(24A)	95-57-8	2- chlorophenol	
(31A)	120-83-2	2,4-dichlorophenol	
(34A)	105-67-9	2,4-dimethylphenol	
(57A)	88-75-5	2- nitrophenol	
(58A)	100-02-7	4-nitrophenol	
(59A)	51-28-5	2,4-dinitrophenol	
(60A)	534-52-1	4,6-dinitro-2-methylphenol	
(64A)	87-86-5	pentachlorophenol	
(65A)	108-95-2	phenol	

BASE/NEUTRAL COMPOUNDS

(1B)	83-32-9	acenaphthene	
(5B)	92-87-5	benzidine	
(8B)	120-82-1	1,2,4-trichlorobenzene	
(9B)	118-74-1	hexachlorobenzene	
(12B)	67-72-1	hexachloroethane	
(18B)	111-44-4	bis(2-chloroethyl)ether	
(20B)	91-58-7	2-chloronaphthalene	
(25B)	95-50-1	1,2-dichlorobenzene	
(26B)	541-73-1	1,3-dichlorobenzene	
(27B)	106-46-7	1,4-dichlorobenzene	
(28B)	91-94-1	3,3'-dichlorobenzidine	
(35B)	121-14-2	2,4-dinitrotoluene	
(36B)	606-20-2	2,6-dinitrotoluene	
(37B)	122-66-7	1,2-diphenylhydrazine	
(39B)	206-44-0	fluoranthene	
(40B)	7005-72-3	4-chlorophenyl phenyl ether	
(41B)	101-55-3	4-bromophenyl phenyl ether	
(42B)	39638-32-9	bis (2-chloroisopropyl) ether	
(43B)	111-91-1	bis (2-chloroethoxy) methane	
(52B)	87-68-3	hexachlorobutadiene	
(53B)	77-47-4	hexachlorocyclopentadiene	
(54B)	78-59-1	isophorone	
(55B)	91-20-3	naphthalene	
(56B)	98-95-3	nitrobenzene	
(62B)	86-30-6	N-nitrosodiphenylamine	
(63B)	621-64-7	N-nitrosodipropylamine	
(66B)	117-81-7	bis (2-ethylhexyl) phthalate	
(67B)	85-68-7	benzyl butyl phthalate	
(68B)	84-74-2	di-n-butyl phthalate	
(69B)	117-84-0	di-n-octyl phthalate	
(70B)	84-66-2	diethyl phthalate	
(71B)	131-11-3	dimethyl phthalate	
(72B)	56-55-3	benzo(a)anthracene	

BASE/NEUTRAL COMPOUNDS

PP #	CAS #		ug/l or ug/kg (circle one)
(73B)	50-32-8	benzo(a)pyrene	
(74B)	205-99-2	benzo(b)fluoranthene	
(75B)	207-08-9	benzo(k)fluoranthene	
(76B)	218-01-9	chrysene	
(77B)	208-96-8	acenaphthylene	
(78B)	120-12-7	anthracene	
(79B)	191-24-2	benzo(ghi)perylene	
(80B)	86-73-7	fluorene	
(81B)	85-01-8	phenanthrene	
(82B)	53-70-3	dibenzo(a,h)anthracene	
(83B)	193-39-5	indeno(1,2,3-cd)pyrene	
(84B)	129-00-0	pyrene	

VOLATILES

(2V)	107-02-8	acrolein	
(3V)	107-13-1	acrylonitrile	
(4V)	71-43-2	benzene	
(6V)	56-23-5	carbon tetrachloride	
(7V)	108-90-7	chlorobenzene	
(10V)	107-06-2	1,2-dichloroethane	
(11V)	71-55-6	1,1,1-trichloroethane	
(13V)	75-34-3	1,1-dichloroethane	
(14V)	79-00-5	1,1,2-trichloroethane	
(15V)	79-34-5	1,1,2,2-tetrachloroethane	
(16V)	75-00-3	chloroethane	
(19V)	110-75-8	2-chloroethylvinyl ether	
(23V)	67-66-3	chloroform	
(29V)	75-35-4	1,1-dichloroethene	
(30V)	156-60-5	trans-1,2-dichloroethene	
(32V)	78-87-5	1,2-dichloropropane	
(33V)	10061-02-6	trans-1,3-dichloropropene	
	10061-01-05	cis-1,3-dichloropropene	
(38V)	100-41-4	ethylbenzene	
(44V)	75-09-2	methylene chloride	
(45V)	74-87-3	chloromethane	
(46V)	74-83-9	bromomethane	
(47V)	75-25-2	bromoform	
(48V)	75-27-4	bromodichloromethane	
(49V)	75-69-4	fluorotrichloromethane	
(50V)	75-71-8	dichlorodifluoromethane	
(51V)	124-48-1	chlorodibromomethane	
(85V)	127-18-4	tetrachloroethene	
(86V)	108-88-3	toluene	
(87V)	79-01-6	trichloroethene	
(88V)	75-01-4	vinyl chloride	

ORGANICS ANALYSIS DATA SHEET - Page 2

Sample Number

Laboratory Name: _____ Case No: _____

Lab Sample I.D. No: _____ QC Report No: _____

Multiply Detection Limits by 1 ☐ or 10 ☐ (Check Box for Appropriate Factor)

PESTICIDES

PP #	CAS #		ug/l or ug/kg (circle one)
(89P)	309-00-2	aldrin	
(90P)	60-57-1	dieldrin	
(91P)	57-74-9	chlordane	
(92P)	50-29-3	4,4'-DDT	
(93P)	72-55-9	4,4'-DDE	
(94P)	72-54-8	4,4'-DDD	
(95P)	115-29-7	α-endosulfan	
(96P)	115-29-7	β-endosulfan	
(97P)	1031-07-8	endosulfan sulfate	
(98P)	72-20-8	endrin	
(99P)	7421-93-4	endrin aldehyde	
(100P)	76-44-8	heptachlor	
(101P)	1024-57-3	heptachlor epoxide	
(102P)	319-84-6	α-BHC	

PESTICIDES

PP #	CAS #		ug/l or ug/kg (circle one)
(103P)	319-85-7	β-BHC	
(104P)	319-86-8	δ-BHC	
(105P)	58-89-9	γ-BHC (lindane)	
(106P)	53469-21-9	PCB-1242	
(107P)	11097-69-1	PCB-1254	
(108P)	11104-28-2	PCB-1221	
(109P)	11141-16-5	PCB-1232	
(110P)	12672-29-6	PCB-1248	
(111P)	11096-82-5	PCB-1260	
(112P)	12674-11-2	PCB-1016	
(113P)	8001-35-2	toxaphene	

DIOXINS

(129B)	1746-01-6	2,3,7,8-tetrachlorodibenzo-p-dioxin	

Non-Priority Pollutant Hazardous Substances List Compounds

ACID COMPOUNDS

CAS #		ug/l or ug/kg (circle one)
65-85-0	benzoic acid	
95-48-7	2-methylphenol	
108-39-4	4-methylphenol	
95-95-4	2,4,5-trichlorophenol	

BASE/NEUTRAL COMPOUNDS

62-53-3	aniline	
100-51-6	benzyl alcohol	
106-47-8	4-chloroaniline	
132-64-9	dibenzofuran	
91-57-6	2-methylnaphthalene	
88-74-4	2-nitroaniline	
99-09-2	3-nitroaniline	
100-01-6	4-nitroaniline	

VOLATILES

CAS #		ug/l or ug/kg (circle one)
67-64-1	acetone	
78-93-3	2-butanone	
75-15-0	carbondisulfide	
519-78-6	2-hexanone	
108-10-1	4-methyl-2-pentanone	
100-42-5	styrene	
108-05-4	vinyl acetate	
95-47-6	o-xylene	

STATE OF CONNECTICUT'S GROUNDWATER ANALYSES

Sample Location	Date Sampled	Priority Pollutant Extractable Organic Contaminan
ERT Well 3A	4-13-82	bis(2-ethylhexyl) phthalate-trace butyl benzyl phthalate-trace, dibutyl phthalate-trace
ERT Well 16	4-13-82	ND
ERT Well 20	4-13-84	ND
ERT Well 29	4-13-84	ND
Davenport Photo	2-10-82	9,15-Octadecadienoic acid*-trace

* - not a priority pollutant

STATE OF CONNECTICUT'S GROUNDWATER ANALYSES (PPM)

Sample Location	Date Sampled	Cd	Cr	Fe	Pb	Hg	Zn	Mn
ERT Well 9	12-11-81	ND	0.01	12.0	0.30	ND	0.46	12.0
ERT Well 17	12-15-81	ND	ND	12.0	0.94	ND	0.49	0.84
ERT Well 20	12-15-81	ND	0.03	0.23	0.28	ND	0.18	8.0

APPENDIX F

Inorganic Priority Pollutants

US ENVIRONMENTAL PROTECTION AGENCY
HWI Sample Management Office
P.O. Box 818 – Alexandria, Virginia 22313
703/557-2490 FTS 8-557-2490

Sample No.

INORGANICS ANALYSIS DATA SHEET

LAB NAME _____ CASE NO. _____

LAB SAMPLE ID. NO. _____ QC REPORT NO. _____

TASK 1 (Elements to be Identified and Measured)

		ug/l or mg/kg (circle one)			ug/l or mg/kg (circle one)
1.	Aluminum		10.	Zinc	
2.	Chromium		11.	Boron	
3.	Barium		12.	Vanadium	
4.	Beryllium		13.	Silver	
5.	Cobalt				
6.	Copper				
7.	Iron				
8.	Nickel				
9.	Manganese				

TASK 2 (Elements to be Identified and Measured)

		ug/l or mg/kg (circle one)			ug/l or mg/kg (circle one)
1.	Arsenic		5.	Mercury	
2.	Antimony		6.	Tin	
3.	Selenium		7.	Cadmium	
4.	Thallium		8.	Lead	

TASK 3 (Elements to be Identified and Measured)

		ug/l or mg/kg (circle one)
1.	Ammonia	
2.	Cyanide	
3.	Sulfide	

COMMENTS:

APPENDIX G

EPA Potential Hazardous Waste Site Inspection Report

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 1 - SITE LOCATION AND INSPECTION INFORMATION

I. IDENTIFICATION
01 STATE: CT | 02 SITE NUMBER: CTD980521082

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER				
Olin Corporation	off of Putnam Avenue				
03 CITY	**04 STATE**	**05 ZIP CODE**	**06 COUNTY**	**07 COUNTY CODE**	**08 CONG DIST**
Hamden	CT	06514	New Haven	009	CT0

09 COORDINATES LATITUDE: 41° 20' 52" | LONGITUDE: 72° 55' 30"

10 TYPE OF OWNERSHIP (Check one)
☒ A. PRIVATE ☐ B. FEDERAL _____ ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL ☐ F. OTHER _____ ☐ G. UNKNOWN

III. INSPECTION INFORMATION

01 DATE OF INSPECTION	02 SITE STATUS	03 YEARS OF OPERATION
May/15/1984 (MONTH DAY YEAR)	☐ ACTIVE ☒ INACTIVE	Circa 1900 (BEGINNING YEAR) | 1973 (ENDING YEAR) ___ UNKNOWN

04 AGENCY PERFORMING INSPECTION (Check all that apply)
☐ A. EPA ☒ B. EPA CONTRACTOR NUS Corporation (Name of firm) ☐ C. MUNICIPAL ☐ D. MUNICIPAL CONTRACTOR _____ (Name of firm)
☐ E. STATE ☐ F. STATE CONTRACTOR _____ (Name of firm) ☐ G. OTHER _____ (Specify)

05 CHIEF INSPECTOR	06 TITLE	07 ORGANIZATION	08 TELEPHONE NO.
John M. Panaro	Chemist	NUS Corp.	(617) 275-2970
09 OTHER INSPECTORS	**10 TITLE**	**11 ORGANIZATION**	**12 TELEPHONE NO.**
Robert S. Palermo	Environmental Scientist	NUS Corp.	(617) 275-2970
Robert Ross	Geologist	NUS Corp.	(617) 275-2970
Larry Fitzgerald	Geologist	NUS Corp.	(617) 275-2970
			( )
			( )

13 SITE REPRESENTATIVES INTERVIEWED	14 TITLE	15 ADDRESS	16 TELEPHONE NO.
Paul Duff	Manager, Environmental and Energy Affairs	Olin Corp. 120 Long Ridge Road Stanford, CT 06904	(203) 356-3476
			( )
			( )
			( )
			( )
			( )

17 ACCESS GAINED BY (Check one)	18 TIME OF INSPECTION	19 WEATHER CONDITIONS
☒ PERMISSION ☐ WARRANT	0700 - 1800	overcast with intermittent sunshine

IV. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NO.
Richard Cavagnero	EPA - Boston	(617) 223-1955

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NO.	08 DATE
John M. Panaro	NUS	FIT	(617) 275-2970	8 / 29 / 84 (MONTH DAY YEAR)

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
CT	CTD980521082

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- X A. SOLID
- _ B. POWDER, FINES
- _ C. SLUDGE
- _ D. OTHER (Specify)
- _ E. SLURRY
- X F. LIQUID
- _ G. GAS

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

- TONS: _____
- CUBIC YARDS: 3500
- NO. OF DRUMS: _____

03 WASTE CHARACTERISTICS (Check all that apply)

- X A. TOXIC
- _ B. CORROSIVE
- _ C. RADIOACTIVE
- X D. PERSISTENT
- X E. SOLUBLE
- _ F. INFECTIOUS
- _ G. FLAMMABLE
- _ H. IGNITABLE
- X I. HIGHLY VOLATILE
- _ J. EXPLOSIVE
- _ K. REACTIVE
- _ L. INCOMPATIBLE
- _ M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			
OLW	OILY WASTE			
SOL	SOLVENTS	unknown		
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS	unknown		part of 3500 cubic yards of waste

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
MES	lead		stor. in unlined, uncov.pits	1,580	ppm
SOL	trichloroethylene	79-01-6	stor. in unlined, uncov. pits	55	ppb
SOL	1,2 - dichloroethane	107-06-2	stor. in unlined, uncov. pits	6.1	ppb
SOL	methylene chloride	75-09-02	stor. in unlined, uncov. pits	6.9	ppb
SOL	tetrachloroethylene	79-34-5	stor. in unlined, uncov. pits	190	ppb
SOL	chlorobenzene	108-90-7	stor. in unlined, uncov. pits	56	ppb
SOL	1,1,1 - trichloroethane	71-55-6	stor. in unlined, uncov. pits	230	ppb
SOL	1,1 -dichloroethylene	75-35-4	stor. in unlined, uncov. pits	11	ppb
SOL	trans - 1,2 - dichloroethylene	156-60-5	stor. in unlined, uncov. pits	23	ppb
SOL	1,2 - dichloropropane	78-87-5	stor. in unlined, uncov. pits	30	ppb
SOL	fluorotrichloromethane	75-69-4	stor. in unlined, uncov. pits	17	ppb
OCC	di-n-butyl phthalate	84-74-2	stor. in unlined, uncov. pits	2,000	ppb
OCC	di-n-octyl phthalate	117-84-0	stor. in unlined, uncov. pits	21	ppb
OCC	fluoranthene	206-44-0	stor. in unlined, uncov. pits	1400	ppb
OCC	bis(2-ethylhexyl)phthalate	117-81-7	stor. in unlined, uncov. pits	910	ppb
OCC	benzo (a) anthracene	56-55-3	stor. in unlined, uncov. pits	820	ppb

V. FEEDSTOCKS (See Appendix for CAS Numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Priority pollutant analyses of samples taken during the NUS/FIT site inspection on 5/15 + 5/16/81.
ERT Phase I and II Investigation Reports (January 1981 + June 1982)
Connecticut DEP analysis (November 1981 - August 1982).

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
CT	CTD980521082

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 [X] A. GROUNDWATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: 90,000
02 [X] OBSERVED (DATE: 12/81+5/84) [ ] POTENTIAL [X] ALLEGED
04 NARRATIVE DESCRIPTION

Onsite groundwater is contaminated with organics and inorganics, and Lake Whitney, a drinking water supply, is located across the street from the northern border of the site.

01 [X] B. SURFACE WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: 90,000
02 [X] OBSERVED (DATE: 12/81+5/84) [ ] POTENTIAL [X] ALLEGED
04 NARRATIVE DESCRIPTION

Onsite surfacewater is contaminated with organics and inorganics and Lake Whitney, a drinking water supply is located across the street from the northern border of the site.

01 [ ] C. CONTAMINATION OF AIR
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: _____) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

01 [ ] D. FIRE/EXPLOSIVE CONDITIONS
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: _____) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

01 [X] E. DIRECT CONTACT
03 POPULATION POTENTIALLY AFFECTED: 3,000 within a one mile radius
02 [ ] OBSERVED (DATE: _____) [X] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

Waste is buried in trenches and some of the waste (old batteries) is exposed at the surface. A fence surrounds the site and the gate is locked but holes in the fence can allow access.

01 [X] F. CONTAMINATION OF SOIL
03 AREA POTENTIALLY AFFECTED: 4 (Acres)
02 [ ] OBSERVED (DATE: 5/84) [ ] POTENTIAL [X] ALLEGED
04 NARRATIVE DESCRIPTION

Priority pollutant analysis of soil from former disposal areas indicated organic and inorganic contamination.

01 [ ] G. DRINKING WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: _____) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

01 [ ] H. WORKER EXPOSURE/INJURY
03 WORKERS POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: _____) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

01 [ ] I. POPULATION EXPOSURE/INJURY
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: _____) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION
01 STATE: CT | 02 SITE NUMBER: CTD980521082

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 ☐ J. DAMAGE TO FLORA
04 NARRATIVE DESCRIPTION
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED

01 ☐ K. DAMAGE TO FAUNA
04 NARRATIVE DESCRIPTION (Include names of species)
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED

01 ☐ L. CONTAMINATION OF FOOD CHAIN
04 NARRATIVE DESCRIPTION
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED

01 ☒ M. UNSTABLE CONTAINMENT OF WASTES
(Spills, Runoff, Standing liquids, Leaking drums)
02 ☐ OBSERVED (DATE: 5/15/84) ☒ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 30,000
04 NARRATIVE DESCRIPTION
The waste is contained in unlined and uncovered trenches.

01 ☐ N. DAMAGE TO OFFSITE PROPERTY
04 NARRATIVE DESCRIPTION
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs
04 NARRATIVE DESCRIPTION
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED

01 ☐ P. ILLEGAL/UNAUTHORIZED DUMPING
04 NARRATIVE DESCRIPTION
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

III. TOTAL POPULATION POTENTIALLY AFFECTED: 90,000

IV. COMMENTS

Priority pollutant analysis of groundwater (monitoring well ERT-7) moving off of the site indicates organic and inorganic contamination.

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Priority Pollutant analysis of groundwater, surface water and soil samples collected by NUS/FIT on 5/15 and 5/16/84.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION
PART 4 - PERMIT AND DESCRIPTIVE INFORMATION

I. IDENTIFICATION
01 STATE: CT | 02 SITE NUMBER: CTD980521082

II. PERMIT INFORMATION

01 TYPE OF PERMIT ISSUED (Check all that apply)	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
☐ A. NPDES				
☐ B. UIC				
☐ C. AIR				
☐ D. RCRA				
☐ E. RCRA INTERIM STATUS				
☐ F. SPCC PLAN				
☐ G. STATE (Specify)				
☐ H. LOCAL (Specify)				
☐ I. OTHER (Specify)				
☒ J. NONE				

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE
☐ A. SURFACE IMPOUNDMENT		
☐ B. PILES		
☐ C. DRUMS, ABOVE GROUND		
☐ D. TANK, ABOVE GROUND		
☐ E. TANK, BELOW GROUND		
☒ F. LANDFILL	3500	cubic yards
☐ G. LANDFARM		
☐ H. OPEN DUMP		
☐ I. OTHER (Specify)		

04 TREATMENT (Check all that apply)
- ☒ A. INCINERATION
- ☐ B. UNDERGROUND INJECTION
- ☐ C. CHEMICAL/PHYSICAL
- ☐ D. BIOLOGICAL
- ☐ E. WASTE OIL PROCESSING
- ☐ F. SOLVENT RECOVERY
- ☐ G. OTHER RECYCLING/RECOVERY
- ☐ H. OTHER (Specify)

05 OTHER
- ☐ A. BUILDINGS ON SITE

06 AREA OF SITE: 102.8 (Acres)

07 COMMENTS

Waste was deposited in trenches and either burned or covered.

IV. CONTAINMENT

01 CONTAINMENT OF WASTES (Check one)

☐ A. ADEQUATE, SECURE ☐ B. MODERATE ☒ C. INADEQUATE, POOR ☐ D. INSECURE, UNSOUND, DANGEROUS

02 DESCRIPTION OF DRUMS, DIKING, LINERS, BARRIERS, ETC.

The waste is contained in unlined and uncovered trenches.

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE: ☒ YES ☐ NO

02 COMMENTS

Holes in the surrounding fence allow access to the waste areas.

VI. SOURCES OF INFORMATION (Cite specific references, e.g. state files, sample analysis, reports)

NUS/FIT Site Inspection (5/15 + 5/16/84)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION
01 STATE: CT | 02 SITE NUMBER: CTD980521082

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY (Check as appropriate)	SURFACE	WELL	02 STATUS: ENDANGERED	AFFECTED	MONITORED	03 DISTANCE TO SITE
COMMUNITY	A. X	B. ☐	A. ☐	B. ☐	C. X	A. 0.1 (mi)
NON-COMMUNITY	C. X	D. X	D. ☐	E. ☐	F. ☐	B. 0.2 (mi)

III. GROUNDWATER

01 GROUNDWATER USE IN VICINITY (Check one)

☐ A. ONLY SOURCE FOR DRINKING | X B. DRINKING (Other sources available) COMMERCIAL, INDUSTRIAL, IRRIGATION (No other water sources available) | ☐ C. COMMERCIAL, INDUSTRIAL, IRRIGATION (Limited other sources available) | ☐ D. NOT USED, UNUSEABLE

02 POPULATION SERVED BY GROUND WATER	03 DISTANCE TO NEAREST DRINKING WATER WELL
45	0.2 (mi)

04 DEPTH TO GROUNDWATER	05 DIRECTION OF GROUNDWATER FLOW	06 DEPTH TO AQUIFER OF CONCERN	07 POTENTIAL YIELD OF AQUIFER	08 SOLE SOURCE AQUIFER
5 - 10 (ft)	north	5 - 10 (ft)	3,000,000 (gpd)	☐ YES X NO

09 DESCRIPTION OF WELLS (Including usage, depth, and relative position to population and buildings)

Dadio well - 30 feet-drinking water-across the street from the southern border of the site.
Tech. Auto well - unknown depth-drinking water-1.3 miles north of the site along Lake Whitney.
H.A. Leed well - unknown depth-industrial-southern border of the site.
Himmel Brothers well - 50 ft.-industrial-western border of the site.
Whitney Retirement Home-unknown depth-industrial-eastern border of the site.

10 RECHARGE AREA		11 DISCHARGE AREA	
X YES ☐ NO	COMMENTS: five ponds exist on-site	X YES ☐ NO	COMMENTS: discharge to Lake Whitney

IV. SURFACE WATER

01 SURFACE WATER USE (Check one)

X A. RESERVOIR, RECREATION DRINKING WATER SOURCE | ☐ B. IRRIGATION, ECONOMICALLY IMPORTANT RESOURCES | ☐ C. COMMERCIAL, INDUSTRIAL | ☐ D. NOT CURRENTLY USED

02 AFFECTED/POTENTIALLY AFFECTED BODIES OF WATER

NAME:	AFFECTED	DISTANCE TO SITE
Lake Whitney	☐	0.1 (mi)
	☐	(mi)
	☐	(mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN

ONE (1) MILE OF SITE	TWO (2) MILES OF SITE	THREE (3) MILES OF SITE
A. 30,000 (NO. OF PERSONS)	B. 94,000 (NO. OF PERSONS)	C. 153,000 (NO. OF PERSONS)

02 DISTANCE TO NEAREST POPULATION: 0.2 (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE	04 DISTANCE TO NEAREST OFF-SITE BUILDING
> 1000	0.2 (mi)

05 POPULATION WITHIN VICINITY OF SITE (Provide narrative description of nature of population within vicinity of site, e.g., rural, village, densely populated urban area)

The site is located in an urban area which is heavily populated.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION
01 STATE: CT | 02 SITE NUMBER: CTD980521082

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE (Check one)

☐ A. $10^{-6} - 10^{-8}$ cm/sec ☐ B. $10^{-4} - 10^{-6}$ cm/sec ☒ C. $10^{-4} - 10^{-3}$ cm/sec ☐ D. GREATER THAN 10^{-3} cm/sec

02 PERMEABILITY OF BEDROCK (Check one)

☐ A. IMPERMEABLE (Less than 10^{-6} cm/sec) ☒ B. RELATIVELY IMPERMEABLE ($10^{-4} - 10^{-6}$ cm/sec) ☐ C. RELATIVELY PERMEABLE ($10^{-2} - 10^{-4}$ cm/sec) ☐ D. VERY PERMEABLE (Greater than 10^{-2} cm/sec)

03 DEPTH TO BEDROCK	04 DEPTH OF CONTAMINATED SOIL ZONE	05 SOIL pH	
50 - 250 (ft)	8 (ft)	acidic	

06 NET PRECIPITATION	07 ONE YEAR 24 HOUR RAINFALL	08 SLOPE: SITE SLOPE	DIRECTION OF SITE SLOPE	TERRAIN AVERAGE SLOPE
18 (in)	3.0 (in)	1 %	towards ponds	1 %

09 FLOOD POTENTIAL

SITE IS IN NA YEAR FLOODPLAIN

10 ☐ SITE IS ON BARRIER ISLAND, COASTAL HIGH HAZARD AREA, RIVERINE FLOODWAY

11 DISTANCE TO WETLANDS (5 acre minimum)

ESTUARINE: A. 2.0 (mi) OTHER: B. _____ (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species)

NA (mi)

ENDANGERED SPECIES: _____

13 LAND USE IN VICINITY

DISTANCE TO:

COMMERCIAL/INDUSTRIAL	RESIDENTIAL AREAS; NATIONAL/STATE PARKS, FORESTS, OR WILDLIFE RESERVES	AGRICULTURAL LANDS: PRIME AG LAND	AGRICULTURAL LANDS: AG LAND
A. 0.2 (mi)	B. 0.5 (mi)	C. 0.2 (mi)	D. 2.5 (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

The site is characterized by prominent hills and ridges, swampy lowlands and valleys containing five interconnected ponds. The surficial geology of this area includes both stratified drift and till, with the till being restricted mainly to regions of higher elevations around the site. The ponds on the site are discharge points for local groundwater, which flows to them from the surrounding highlands. Lake Whitney is the largest and most significant surface water receptor downgrdient of the site, while wells (industrial and residential) that surround the site are possible groundwater receptors.

VII. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Environmental Research and Technology, Inc. Phase I (January 1981) and Phase II (June 1982) Investigation of the Pine Swamp, Hamden, Connecticut, Olin Corporation.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 6 - SAMPLE AND FIELD INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
CT	CTD980521082

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER	17	Rocky Mtn. Analytical, Arvada, CO -metals analysis Mead Compuchem, Chapel Hill, N.C.-organic analysis	7/10/84
SURFACE WATER	8	Rocky Mtn. Analytica, Arvada, CO-metals analysis Mead Compuchem, Chapel Hill, N.C.-organic analysis	7/10/84
WASTE			
AIR			
RUNOFF			
SPILL			
SOIL			
VEGETATION	3	Rocky Mtn. Analytical, Arvada, CO-metals analysis Mead Compuchem, Chapel Hill, N.C.-organic analysis	7/10/84
OTHER			

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS
Air monitoring	An HNu was used for soil and groundwater sampling.
well depth	

IV. PHOTOGRAPHS AND MAPS

01 TYPE ☐ GROUND ☐ AERIAL

02 IN CUSTODY OF _____ (Name of organization or individual)

03 MAPS ☒ YES ☐ NO

04 LOCATION OF MAPS NUS/FIT, Bedford, MA

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

None

VI. SOURCES OF INFORMATION (Cite specific references, e.g. state files, sample analysis, reports)

NUS/FIT site inspection on May 15 and 16, 1984.

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 7 - OWNER INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
CT	CTD980521082

II. CURRENT OWNER(S)

01 NAME	02 D+B NUMBER
Olin Corporation	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
275 Winchester Avenue	

05 CITY	06 STATE	07 ZIP CODE
New Haven	CT	06504

01 NAME / 02 D+B NUMBER / 03 STREET ADDRESS (P.O. Box, RFD #, etc.) / 04 SIC CODE / 05 CITY / 06 STATE / 07 ZIP CODE

01 NAME / 02 D+B NUMBER / 03 STREET ADDRESS (P.O. Box, RFD #, etc.) / 04 SIC CODE / 05 CITY / 06 STATE / 07 ZIP CODE

01 NAME / 02 D+B NUMBER / 03 STREET ADDRESS (P.O. Box, RFD #, etc.) / 04 SIC CODE / 05 CITY / 06 STATE / 07 ZIP CODE

PARENT COMPANY (If applicable)

08 NAME / 09 D+B NUMBER / 10 STREET ADDRESS (P.O. Box, RFD #, etc.) / 11 SIC CODE / 12 CITY / 13 STATE / 14 ZIP CODE

08 NAME / 09 D+B NUMBER / 10 STREET ADDRESS (P.O. Box, RFD #, etc.) / 11 SIC CODE / 12 CITY / 13 STATE / 14 ZIP CODE

08 NAME / 09 D+B NUMBER / 10 STREET ADDRESS (P.O. Box, RFD #, etc.) / 11 SIC CODE / 12 CITY / 13 STATE / 14 ZIP CODE

08 NAME / 09 D+B NUMBER / 10 STREET ADDRESS (P.O. Box, RFD #, etc.) / 11 SIC CODE / 12 CITY / 13 STATE / 14 ZIP CODE

III. PREVIOUS OWNER(S) (List most recent first)

01 NAME / 02 D+B NUMBER / 03 STREET ADDRESS (P.O. Box, RFD #, etc.) / 04 SIC CODE / 05 CITY / 06 STATE / 07 ZIP CODE

01 NAME / 02 D+B NUMBER / 03 STREET ADDRESS (P.O. Box, RFD #, etc.) / 04 SIC CODE / 05 CITY / 06 STATE / 07 ZIP CODE

01 NAME / 02 D+B NUMBER / 03 STREET ADDRESS (P.O. Box, RFD #, etc.) / 04 SIC CODE / 05 CITY / 06 STATE / 07 ZIP CODE

IV. REALTY OWNER(S) (If applicable; list most recent first)

01 NAME / 02 D+B NUMBER / 03 STREET ADDRESS (P.O. Box, RFD #, etc.) / 04 SIC CODE / 05 CITY / 06 STATE / 07 ZIP CODE

01 NAME / 02 D+B NUMBER / 03 STREET ADDRESS (P.O. Box, RFD #, etc.) / 04 SIC CODE / 05 CITY / 06 STATE / 07 ZIP CODE

01 NAME / 02 D+B NUMBER / 03 STREET ADDRESS (P.O. Box, RFD #, etc.) / 04 SIC CODE / 05 CITY / 06 STATE / 07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA Files.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 8 - OPERATOR INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
CT	CTD980521082

II. CURRENT OPERATOR (Provide if different from owner)

01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER

OPERATOR'S PARENT COMPANY (If applicable)

10 NAME	11 D+B NUMBER
12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE
14 CITY	15 STATE / 16 ZIP CODE

III. PREVIOUS OPERATOR(S) (List most recent first; provide only if different from owner)

PREVIOUS OPERATORS' PARENT COMPANIES (If applicable)

01 NAME	02 D+B NUMBER	10 NAME	11 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	14 CITY	15 STATE / 16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD		
01 NAME	02 D+B NUMBER	10 NAME	11 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	14 CITY	15 STATE / 16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD		
01 NAME	02 D+B NUMBER	10 NAME	11 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	14 CITY	15 STATE / 16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD		

IV. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 9 - GENERATOR/TRANSPORTER INFORMATION

I. IDENTIFICATION
01 STATE: CT | 02 SITE NUMBER: CTD980521082

II. ON-SITE GENERATOR

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

III. OFF-SITE GENERATOR(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
Olin Corporation			
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	**04 SIC CODE**	**03 STREET ADDRESS (P.O. Box, RFD #, etc.)**	**04 SIC CODE**
275 Winchester Ave.			
05 CITY	**06 STATE**	**07 ZIP CODE**	**05 CITY**	**06 STATE**	**07 ZIP CODE**
New Haven	CT	06504			
01 NAME	**02 D+B NUMBER**	**01 NAME**	**02 D+B NUMBER**
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	**04 SIC CODE**	**03 STREET ADDRESS (P.O. Box, RFD #, etc.)**	**04 SIC CODE**
05 CITY	**06 STATE**	**07 ZIP CODE**	**05 CITY**	**06 STATE**	**07 ZIP CODE**

IV. TRANSPORTER(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
Olin Corporation			
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	**04 SIC CODE**	**03 STREET ADDRESS (P.O. Box, RFD #, etc.)**	**04 SIC CODE**
275 Winchester Ave.			
05 CITY	**06 STATE**	**07 ZIP CODE**	**05 CITY**	**06 STATE**	**07 ZIP CODE**
New Haven	CT	06504			
01 NAME	**02 D+B NUMBER**	**01 NAME**	**02 D+B NUMBER**
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	**04 SIC CODE**	**03 STREET ADDRESS (P.O. Box, RFD #, etc.)**	**04 SIC CODE**
05 CITY	**06 STATE**	**07 ZIP CODE**	**05 CITY**	**06 STATE**	**07 ZIP CODE**

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA Files
State Files
ERT Phase I Report

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION
01 STATE: CT | 02 SITE NUMBER: CTD980521082

II. PAST RESPONSE ACTIVITIES

01 ☐ A. WATER SUPPLY CLOSED
02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☐ B. TEMPORARY WATER SUPPLY PROVIDED
02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☐ C. PERMANENT WATER SUPPLY PROVIDED
02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☐ D. SPILLED MATERIAL REMOVED
02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☐ E. CONTAMINATED SOIL REMOVED
02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☐ F. WASTE REPACKAGED
02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☒ G. WASTE DISPOSED ELSEWHERE
02 DATE March 1966 03 AGENCY Olin Corp.
04 DESCRIPTION
Olin removed the majority of non-combustible material per order from the town of Hamden.

01 ☐ H. ON SITE BURIAL
02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☐ I. IN SITU CHEMICAL TREATMENT
02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☐ J. IN SITU BIOLOGICAL TREATMENT
02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☐ K. IN SITU PHYSICAL TREATMENT
02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☐ L. ENCAPSULATION
02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☐ M. EMERGENCY WASTE TREATMENT
02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☐ N. CUTOFF WALLS
02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☐ O. EMERGENCY DIKING/SURFACE WATER DIVERSION
02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☐ P. CUTOFF TRENCHES/SUMP
02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☐ Q. SUBSURFACE CUTOFF WALL
02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
CT	CTD980521082

II PAST RESPONSE ACTIVITIES (Continued)

01 ☐ R. BARRIER WALLS CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ S. CAPPING/COVERING — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ T. BULK TANKAGE REPAIRED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ U. GROUT CURTAIN CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ V. BOTTOM SEALED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ W. GAS CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ X. FIRE CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ Y. LEACHATE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ Z. AREA EVACUATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ 1. ACCESS TO SITE RESTRICTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ 2. POPULATION RELOCATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ 3. OTHER REMEDIAL ACTIVITIES — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA Files

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 11 - ENFORCEMENT INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
CT	CTD980521082

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY ENFORCEMENT ACTION ☒ YES ☐ NO

02 DESCRIPTION OF FEDERAL, STATE, LOCAL REGULATORY ENFORCEMENT ACTION

In March 1966, the town of Hamden issued an order to Olin to remove all non-combustible material from the site.

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA Files.

EPA FORM 2070-13 (7-81)